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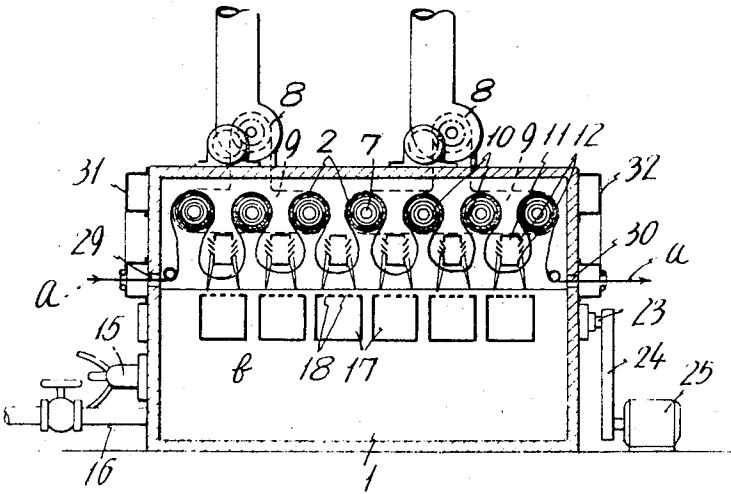
[54] **APPARATUS FOR HEAT TREATMENT OF FABRIC**  
**10 Claims, 6 Drawing Figs.**

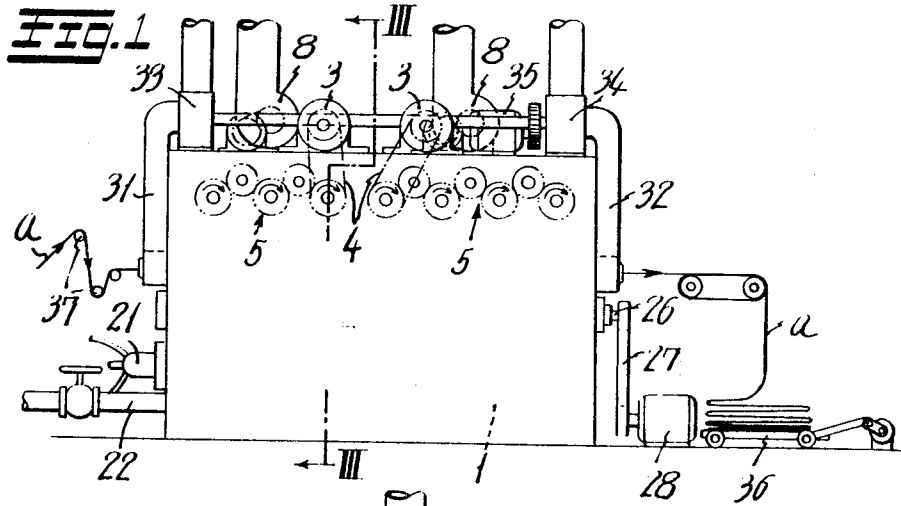
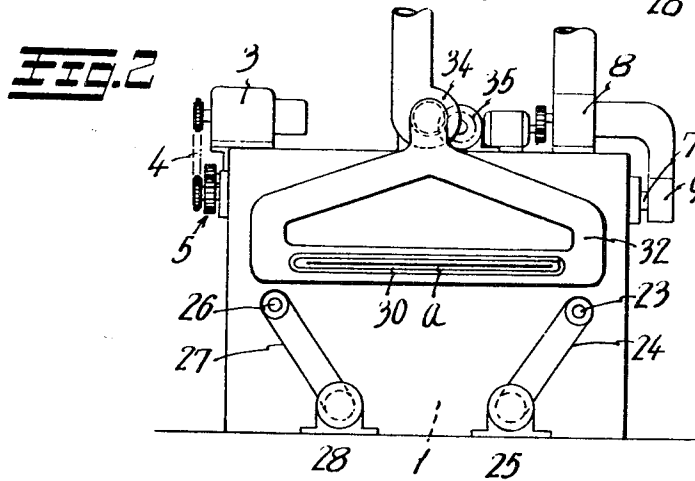
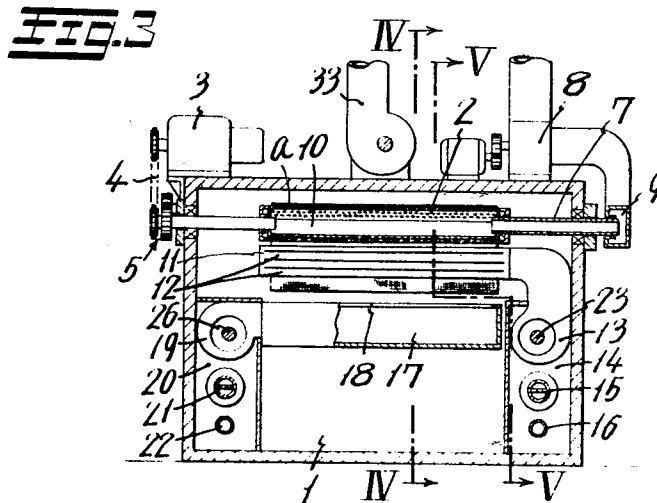
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[56] **References Cited**  
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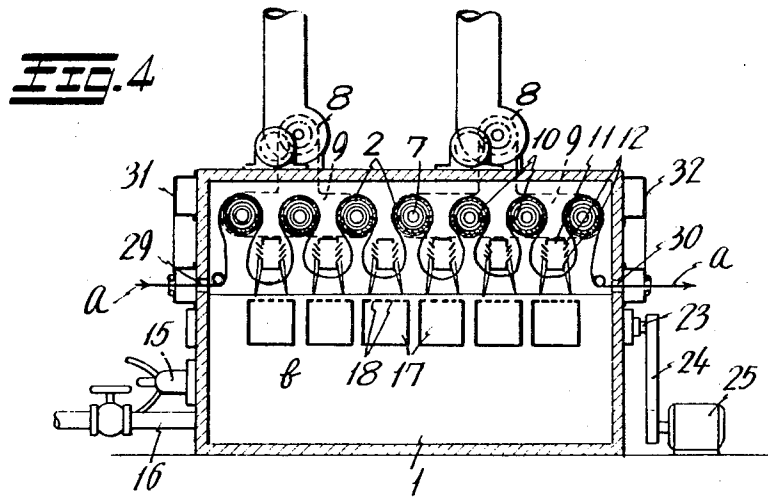
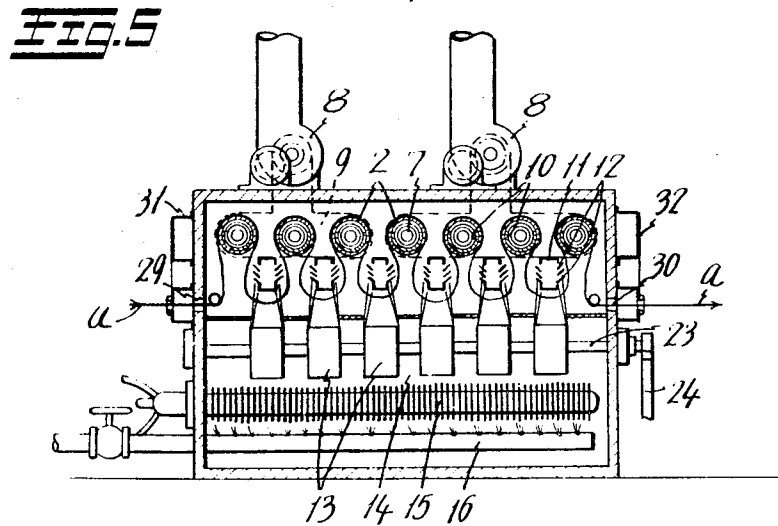
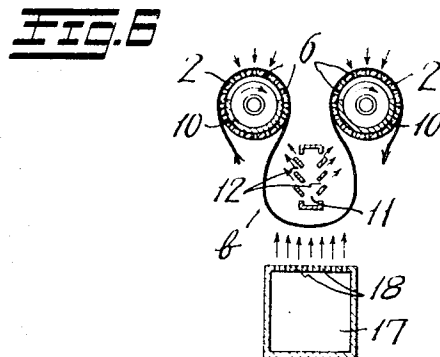
**ABSTRACT:** A fabric heat treatment apparatus comprises a heat treatment chamber containing a plurality of suction feed rolls arranged horizontally to support and advance the fabric through the chamber while the fabric hangs in loops between adjacent rolls. Steam drums are positioned both within the loops and therebelow and the drums have outlets facing the loops to project steam thereagainst to lift and heat the fabric as it passes through the heat treatment chamber whereby to relieve the fabric of tension.





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## APPARATUS FOR HEAT TREATMENT OF FABRIC

## BRIEF SUMMARY OF THE INVENTION

This invention relates to apparatus for continuous heat treatment using superheated steam for steam baking, thermosol coloring, drying or the like, chiefly for a bulky woven or knitted material, or a woven or knitted material not resistant to tension force.

According to the invention several feed rolls are arranged to adhere a fabric to the surfaces thereof by the action of air suction and the rolls are parallel to one another within a heating chamber, so that the fabric to be treated is conveyed by these rolls while hanging down to form a loop between respective adjacent rolls; steam projecting drums are provided at the inner and lower surfaces of each loop so that the fabric is supported and lifted while being heated by the steam discharged from the steam projecting drums at each loop.

## BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side view of one embodiment of this invention;  
FIG. 2 is a sectional view taken along the line II—II in FIG.

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FIG. 3 is a sectional view taken along the line III—III in FIG.

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FIG. 4 is a sectional view taken along the line IV—IV in FIG. 3;

FIG. 5 is a sectional view taken along the line V—V in FIG. 3; and

FIG. 6 is an enlarged diagrammatical sectional side view of a portion of the embodiment.

## DETAILED DESCRIPTION

Referring to the drawing, numeral 1 denotes a heating chamber, and several feed rolls 2 are mounted parallel to one another at the upper portion of the interior of the heating chamber 1. Two electric motors 3 are supported on the top surface of the heating chamber 1, and one of the motors is used to drive the front three feed rolls 2 through a chain 4 and a gear train 5, and the other of the motors is used to drive the rear four feeding rolls 2 similarly through a chain 4 and a gear train 5. Each feed roll 2 is shaped as a hollow cylinder with a number of small perforations 6 in its circumferential wall, and the roll has one end axle 7 formed as a hollow tube. The front three rolls 2 are in communication at their hollow axles 7 with suction air apparatus 8, which comprises a suction air blower, through a suction air duct 9. Similarly, the rear four rolls 2 are in communication at their hollow axles 7 with a second suction air apparatus 8 through a suction air duct 9. Thus, each roll 2 is subjected to a suction at the interior thereof.

The fabric *a* is charged into the chamber 1 from one end thereof and is so engaged with rolls 2 that the fabric hangs down to form a loop *b* between respective adjacent rolls 2 (see FIGS. 4–6), and thus by the rotation of rolls 2, the fabric *a* is caused to travel in one direction for being discharged from the other end of the chamber 1. During this operation, the fabric *a* is adhered to the surface of each roll 2 by the action of the suction air through the small perforations 6, whereby the travel of the fabric may be ensured. In this case, however, it is preferable that the lower half portion of each roll 2 is provided at its inner surface with a covering plate 10, so that the air suction is not dissipated through the perforations 6 at that portion. The covering plate 10 can also be placed at the outer surface of the roll.

Along the inner surface of each loop *b* which has been formed by the fabric *a* hanging between respective adjacent rolls 2, there is provided a steam projecting drum 11. Drum 11 is provided at both side surfaces thereof with steam projecting openings 12 directed obliquely upwards to face the fabric *a* and discharge steam thereagainst and cause the fabric *a* to be lifted upwards as shown in FIG. 6. The steam projecting drums 11 are in communication through respective blowers 13 with

the interior of a chamber 14 containing at its upper end an oil heater 15 and at its lower end a saturated-steam supply pipe 16, so that the steam supplied from the pipe 16 may be superheated and directed to the fabric *a*.

Additionally, below the lower surface of each loop *b* there is provided a steam projecting drum 17 having openings 18 in its top surface to direct steam towards the fabric *a* to lift the same upwardly as shown in FIG. 6. The drums 17 are in communication through respective blowers 19 with the interior of a chamber 20 containing an oil heater 21 and a saturated steam supply pipe 22, so that the steam supplied from the pipe 22 may be superheated and directed to the fabric *a*.

The blowers 13 have a single common shaft 23 which is driven through a belt 24 by an electric motor 25. Similarly, the blowers 19 have a single common shaft 26 which is driven through a belt 27 by an electric motor 28. Numerals 29 and 30 are inlet and outlet openings of the heating chamber 1 for the fabric *a*, and these openings 29 and 30 are in communication through respective exhaust ducts 31 and 32 with respective exhaust blowers 33 and 34. These blowers 33 and 34 are arranged to be driven by a single common electric motor 35. Numeral 36 denotes a reciprocating carriage for the folding and receiving of the discharged fabric *a*, and numeral 37 denotes guide rolls for the fabric *a*.

In the apparatus, the fabric *a* to be treated is fed into the heating chamber 1 and is caused to travel in one direction by the rotation of the feed rolls 2 while being engaged by the successive rolls 2 to hang therebetween and form loops *b* between respective adjacent rolls 2. During the travel of the fabric *a*, it is subjected to a heat treatment or a drying treatment of the like by the steam discharged from the steam drums 11 and 17 facing the inner and lower surfaces of the loops *b*. During this treatment, the hanging loops *b* are lifted by the steam discharged from drums 11 and 17 so that the fabric *a* is free from any tension which is otherwise caused by its own weight, and the portion of the fabric *a* is engaged and resting on each roll is held in close contact with the surface of the roll by the air suction from the inside of the roll. Hence the fabric *a* can be heated while being advanced at a constant speed of travel, and thereby the working progress can be maintained constant. Furthermore, the fabric *a* is entirely free from any tension, so that the fabric *a* can be treated without being spoiled as regards its bulkiness. The apparatus is thus suitable for such continuous heat treatment as steam baking, thermosol coloring, heat drying or the like, for a fabric which must not be subjected to tension or a bulky fabric which is liable to be subjected to a large tension.

What is claimed is:

1. Fabric heat treatment apparatus comprising a treatment chamber, spaced feed rolls in said chamber for engaging the fabric to advance the same through said chamber while the fabric hangs in loops between adjacent rolls, and means for projecting a heating medium against the loops of fabric in an upward direction to support and lift the loops while heating the same whereby to relieve the fabric of tension in the loops.

2. Apparatus as claimed in claim 1, wherein said feed rolls are perforate at least in the upper surface thereof, said fabric resting on the upper surface of the rolls, and means for establishing a suction within the rolls.

3. Apparatus as claimed in claim 2, wherein said means for projecting heating medium comprises drums positioned within said loops and having outlets facing said loops at the inner surfaces thereof.

4. Apparatus as claimed in claim 3, wherein said outlets face obliquely upwards.

5. Apparatus as claimed in claim 3, wherein said means for projecting heating medium further comprises additional drums positioned beneath the loops and having upwardly facing outlets for discharging medium against said loops to support and lift the same.

6. Apparatus as claimed in claim 5 comprising steam chambers connected to said drums and blowers to feed steam from the chambers to said drums, said heating medium being the steam.

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7. Apparatus as claimed in claim 4, wherein said outlets are disposed on opposite sides of said drums to face opposite inner surfaces of the loops.

8. Apparatus as claimed in claim 6 comprising heating means in said steam chambers to superheat the steam therein.

9. Apparatus as claimed in claim 2, wherein said feed rolls include hollow axles communicating with the interior of said

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rolls, and said means for establishing suction within the rolls comprises a suction blower connected to said axles.

10. Apparatus as claimed in claim 1, wherein said feed rolls are arranged in a horizontal row in successive groups, and means is provided for driving the rolls of each group in rotation.

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