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3 SHEETS—SHEET 1.

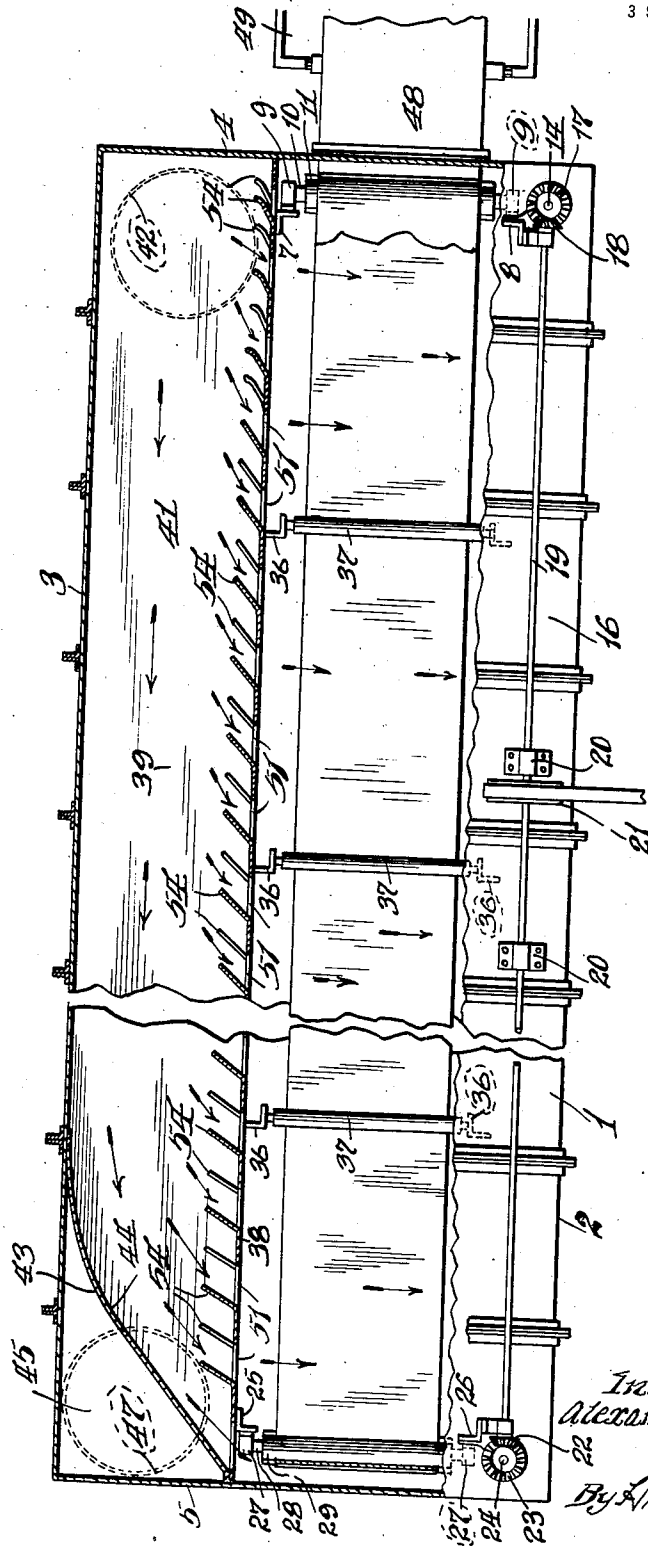


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Patented July 8, 1919.
 3 SHEETS—SHEET 2.

Fig. 2.



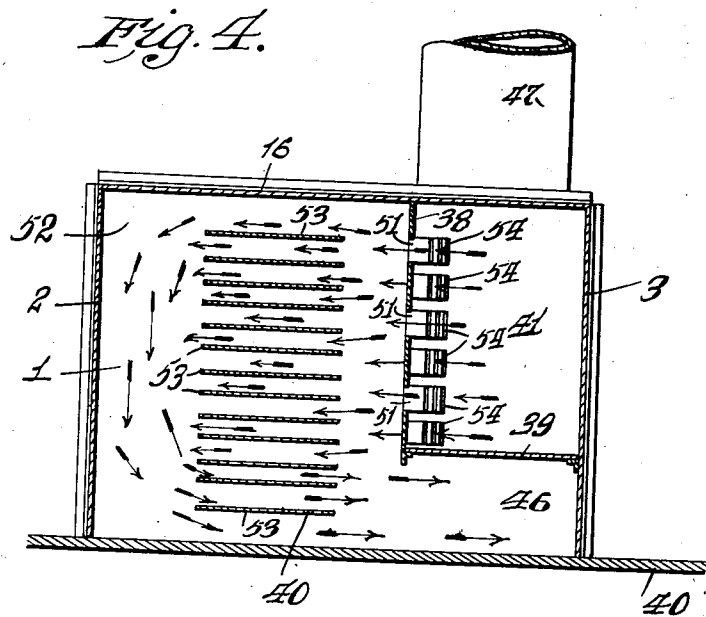
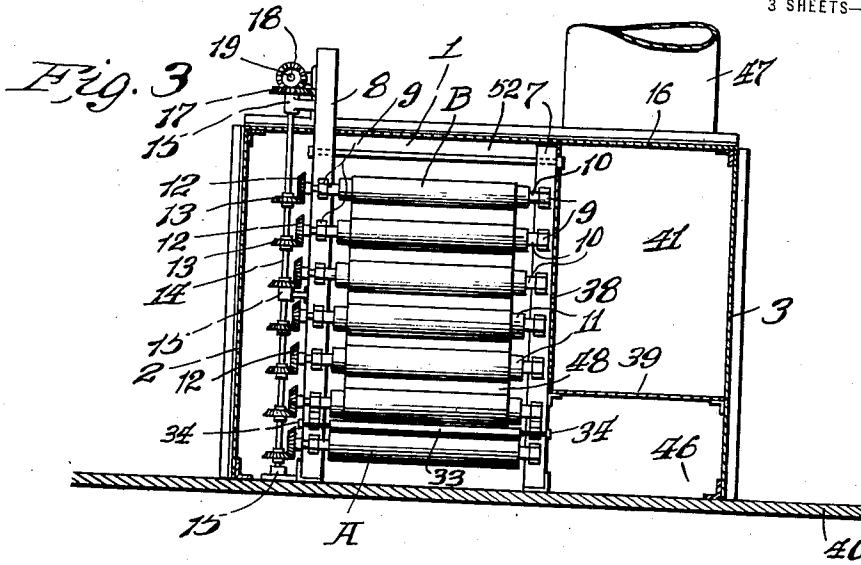
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 DRYING AND SHRINKING DEVICE.
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1,308,951.

Patented July 8, 1919.
 3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ALEXANDER L. JACOBS, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-FOURTH TO ALBERT J. FRANKE AND ONE-FOURTH TO LOUIS N. FRANKE, BOTH OF ST. LOUIS, MISSOURI.

DRYING AND SHRINKING DEVICE.

1,308,951.

Specification of Letters Patent.

Patented July 8, 1919.

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To all whom it may concern:

Be it known that I, ALEXANDER L. JACOBS, a citizen of the United States of America, and a resident of the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Drying and Shrinking Devices, of which the following is a specification.

The primary object of this invention is to provide an improved drying and shrinking device relative to treating fabric materials, in which the material in a wet condition is fed into the device, and during the passage of the material through the device, it is dried and shrunk, and in which when the material leaves this improved device after passing therethrough, the same is in a finished condition.

Another object is to provide improved means for taking care of the shrinking tension of the fabric material as it travels through this improved drying and shrinking device.

A further object is to provide an improved arrangement of carrying rollers for conveying the fabric material through the drying and shrinking device, and an improved arrangement of air directing means whereby the traveling material is subjected to a uniform treatment of hot air currents, so that the shrinking of the material throughout its length is equal.

Other and further objects will appear in the specification and be specifically pointed out in the appended claims, reference being had to the accompanying drawings exemplifying the invention, and in which,

Figure 1 is a longitudinal section taken through this improved drying and shrinking device, having an intermediate portion thereof broken away.

Fig. 2 is a horizontal section taken approximately on the line II—II of Fig. 1.

Fig. 3 is a transverse section taken on the line III—III of Fig. 1.

Fig. 4 is a transverse section taken on the line IV—IV of Fig. 1.

Referring to the drawings, this improved device comprises a housing 1 having side walls 2 and 3 and end walls 4 and 5, and formed in the end wall 4 adjacent the bottom thereof is a horizontal inlet opening 6.

Located in the housing 1 adjacent the end wall 4 are a pair of standards 7 and 8, and secured to each of said standards are a

plurality of bearings 9, each bearing of each standard 7 being in horizontal alinement with a bearing of the standard 8, each pair of horizontally arranged bearings supporting a shaft 10, and securely mounted on each of said shafts between each pair of bearings is a power roller 11, said rollers being of different diameters, of which the lowermost roller A is of the largest diameter, whereas the uppermost roller B is of the smallest diameter; the intermediate rollers between said rollers A and B diminishing in diameter upwardly in their vertical arrangement.

Secured to each of said shafts 10 at one end is a bevel pinion 12, each of said pinions meshing with a bevel gear 13, each of said bevel gears 13 being mounted on a vertical shaft 14 which is supported in bearings 15, said bearings being secured to the standard 8.

Secured to the upper end of the vertical shaft 14 above the top 16 of the housing 1 is a bevel gear 17, said bevel gear 17 being in mesh with the bevel pinion 18 which is mounted on the horizontally arranged shaft 19, said shaft 19 being supported in bearings 20, said bearings being mounted on the top wall 16 of the housing 1, said shaft 19 having a driving pulley 21 mounted thereon.

Secured to the opposite end of the shaft 19 is a bevel pinion 22, said pinion meshing with a bevel gear 23 which is secured to the upper end of a vertically arranged shaft 24, said shaft 24 extending into the housing 1 adjacent the end wall 5.

Located in said housing 1 adjacent the end wall 5 are a pair of vertically arranged standards 25 and 26, said standards having brackets 27 secured thereto, said brackets supporting horizontally arranged shafts 28, each of said shafts 28 having a power roller 29 secured thereto. Each of these shafts 28 has a bevel pinion secured thereto in the manner as related relative to the bevel pinions 12 of the shafts 10 and rollers 11 which are arranged at the opposite end of the housing 1 adjacent the end wall 4, said bevel pinions, not shown, meshing with bevel gears which are adapted to be supported on the vertical shaft 24 in a manner similar to the bevel gears 13 of the vertical shaft 14, the horizontal driving shaft 19 being arranged to cooperate with the vertical shafts 14 and 24 through the respective bevel gears

17 and 18 and 22 and 23, in which when power is applied to the horizontal shaft 19 and vertical shafts 14 and 24, the set of rollers 11 will be driven in a direction opposite to the set of rollers 29. The set of rollers 29 are of different diameters as are the set of rollers 11, in which the lowermost roller designated as C is the larger, and each succeeding roller mounted in vertical order above said roller C is of lesser diameter, in which the uppermost roller designated as D will be the smallest roller in the set.

Located beneath the roller D is a horizontally arranged pressure roller 30, each end of said roller being supported by a pivoted lever 31, and there being a weight 32 secured to the opposite end of each lever 31. Horizontally arranged above the lowermost roller A of the set of rollers 11 is a pressure roller 33, which is supported by a pair of pivoted levers 34, and secured to the opposite ends of said levers is a spring 35.

Arranged in pairs in the housing 1 intermediate of the sets of power rollers 11 and 29 are standards 36, each of said pair of standards supporting a plurality of horizontally arranged and vertically alining idler rollers 37.

Depending downwardly from the top wall 16 of the housing 1 and arranged against the standards 36 is a vertical wall 38, said wall extending the full length of the housing 1 and having its lower edge abut against a horizontally arranged platform 39 which is located a distance above the flooring 40, said platform 39 extending over to the side wall 3, said vertical wall 38 and platform 39 forming a hot air chamber 41.

Communicating with the chamber 41 through the top wall 16 and adjacent the end wall 4 is a hot air supply pipe 42. The platform 39 is cut away adjacent the end wall 5 as shown at 43, and there being an angularly arranged vertical partition 44 extending upwardly from said platform which forms an end wall to the hot air chamber 41, said cut away portion 43 of the platform 39 and partition 44 also forming a vertical passageway 45 which leads upwardly from the longitudinally formed passageway 46 which is formed beneath the platform 39 to the discharge air pipe 47.

In the operation of this improved drying and shrinking device, the material which is designated as 48 is first immersed in the cold water vat 49, and in order to interlace the material over and between the power and idler rollers, any suitable material is first introduced through the inlet opening 6 and between the lowermost power roller A and the pressure roller 33, then over the lowermost set of idler rollers 37, then around the lowermost pressure roller C, then back through the housing 1 and over the second row of idler rollers, then over the next

power roller 11 in order above the lowermost power roller A and so on back and forth as shown in Fig. 1 until the introducing end of the leading material is finally introduced between the pressure roller 30 and uppermost power roller D, then through the horizontally arranged outlet opening 50. The rear end of the introducing or leading material which is left extending from the inlet opening 6 is then stitched to the water saturated fabric material 48.

The driving shaft 19 is then put in operation, and the power rollers 11 and 29 are revolved, thereby drawing the wet material to be dried and shrunk into the housing 1, and passing the same longitudinally through the housing in zig-zag order.

In the meantime the hot air supply has been turned on and hot air will be discharged from the chamber 41 through the staggered apertures 51 which are formed in the vertical wall 38, the hot air entering the drying and shrinking chamber 52 in the direction of the arrows as indicated in Fig. 4, the hot air currents engaging the horizontally arranged fabric layers 53 as it passes thereover, and inasmuch as the tension of the traveling material will cause the horizontal layers of material to sag between the supporting idler rollers 37, a more or less undulating motion will be given to the traveling material, in which the material will tend to engage and deflect the traversing air currents, thereby producing a maximum drying and heating effect on the material.

The air currents after passing between the horizontal layers 53 of the fabric will travel downwardly adjacent the side wall 2 and tend to incline toward the discharge passageway 46, thereby engaging and passing through the lowermost horizontal layers 53 of the fabric. The air currents will then travel longitudinally along the horizontal passageway 46 and be discharged up the vertical passageway 45 to the discharge pipe 47.

It is to be noted that on account of the zig-zag longitudinal travel of the material through this improved device that a uniformity of heat will be given throughout a solid body of material being shrunk, as it is quite evident that the temperature adjacent the upper horizontal layers 53 of the material is greater than the temperature adjacent the lower layers of traveling material. Therefore, since all of the material passing through this improved device has to eventually travel through the different air temperatures, and at a given time, the drying and heating effect on the material will be uniform, hence, a uniform shrinkage of the material.

In order to provide a positive feed relative to the material to be dried and shrunk

entering the housing 1 and to the treated material being discharged through the outlet 50, the pressure rollers 33 and 30 are provided as afore related, said rollers bearing against respective power rollers A and D.

In a device of this improved character in which the traveling material being treated is under tension, it is necessary that care be taken of the shrinking strain which will be added to the tension. In this connection, attention is called to the sets of rollers 11 and 29, said rollers in their vertical alinement being graduated relative to one another, in which the lowermost rollers are larger than the succeeding uppermost rollers, in which the peripheral travel of the smaller rollers will be less than that of the larger rollers, thereby providing for the take-up given to the material, due to shrinkage, in which the shrinking strain is released, thereby preventing distorting pulling strains on the material which otherwise would be given to the material, providing the rollers were of the same diameters.

In order to more fully equalize the air currents passing from the chamber 41 to the chamber 52 throughout the length of said chamber 52, graduated deflecting portions 54 are formed adjacent the openings 51 of the wall 38.

What I claim is:

1. A drying and shrinking device comprising a housing, a set of horizontal power rollers arranged in vertical alinement adjacent each end of said housing, said rollers adapted to carry a fabric in zig-zag order through said housing, said roller sets having their uppermost rollers of a smaller diameter than the lowermost rollers.

2. A drying and shrinking device comprising a housing, a set of horizontally arranged power rollers arranged one above another, located adjacent each end of said housing, the rollers of said roller sets diminishing in diameter from the lowermost to the uppermost thereof, said rollers adapted to convey a fabric longitudinally through said housing, and in zig-zag order, in which the fabric when fed into said housing, adjacent the bottom thereof, will travel toward the top of said housing.

3. A drying and shrinking device comprising a housing, a set of horizontally arranged power rollers arranged one above another, located adjacent each end of said housing, the rollers of said roller sets diminishing in diameter from the lowermost to the uppermost thereof, said rollers adapted to convey a fabric longitudinally through said housing, and in zig-zag order, in which the

fabric when fed into said housing, adjacent the bottom thereof, will travel toward the top of said housing, and means for applying air currents transversely across the longitudinally traveling fabric.

4. A drying and shrinking device comprising a housing, a set of horizontally arranged power rollers arranged one above another, located adjacent each end of said housing, the rollers of each of said roller sets diminishing in diameter from the lowermost to the uppermost thereof, said rollers adapted to convey a fabric which is fed into the housing adjacent the bottom thereof longitudinally back and forth in said housing, in which the fabric will gradually travel toward the top of said housing, means for providing hot air currents in said housing, the diminishing diameter of said roller sets providing for relieving the shrinking tension of the traveling fabric.

5. A drying and shrinking device, comprising a housing, a plurality of horizontally arranged power rollers located in said housing, said rollers providing means for conveying a fabric horizontally back and forth in said housing, and toward the top of said housing, in which the fabric when fed into the bottom of said housing will eventually be discharged from the housing adjacent the top, a hot air inlet passageway formed in said housing, and a discharge passageway formed adjacent the bottom of said housing, and means provided by said passageways and the horizontally traveling fabric through said housing whereby the air currents from said inlet passageway are discharged across the horizontal traveling fabric.

6. A drying and shrinking device comprising a housing, a pair of horizontally arranged roller sets located in said housing, said rollers adapted to convey a fabric material horizontally back and forth through said housing and in zig-zag order toward the top of said housing, means for introducing heated air currents to the traveling material in said housing, and means operable with the traveling material for relieving the shrinking tension thereof.

7. A drying and shrinking device comprising a housing, horizontally arranged rollers located in said housing, said rollers adapted to convey a fabric material in zig-zag order through said housing, means for introducing heated air currents to the traveling material as it passes through said housing, and means operable with the traveling material for relieving the shrinking tension thereof from said rollers.

ALEXANDER L. JACOBS.