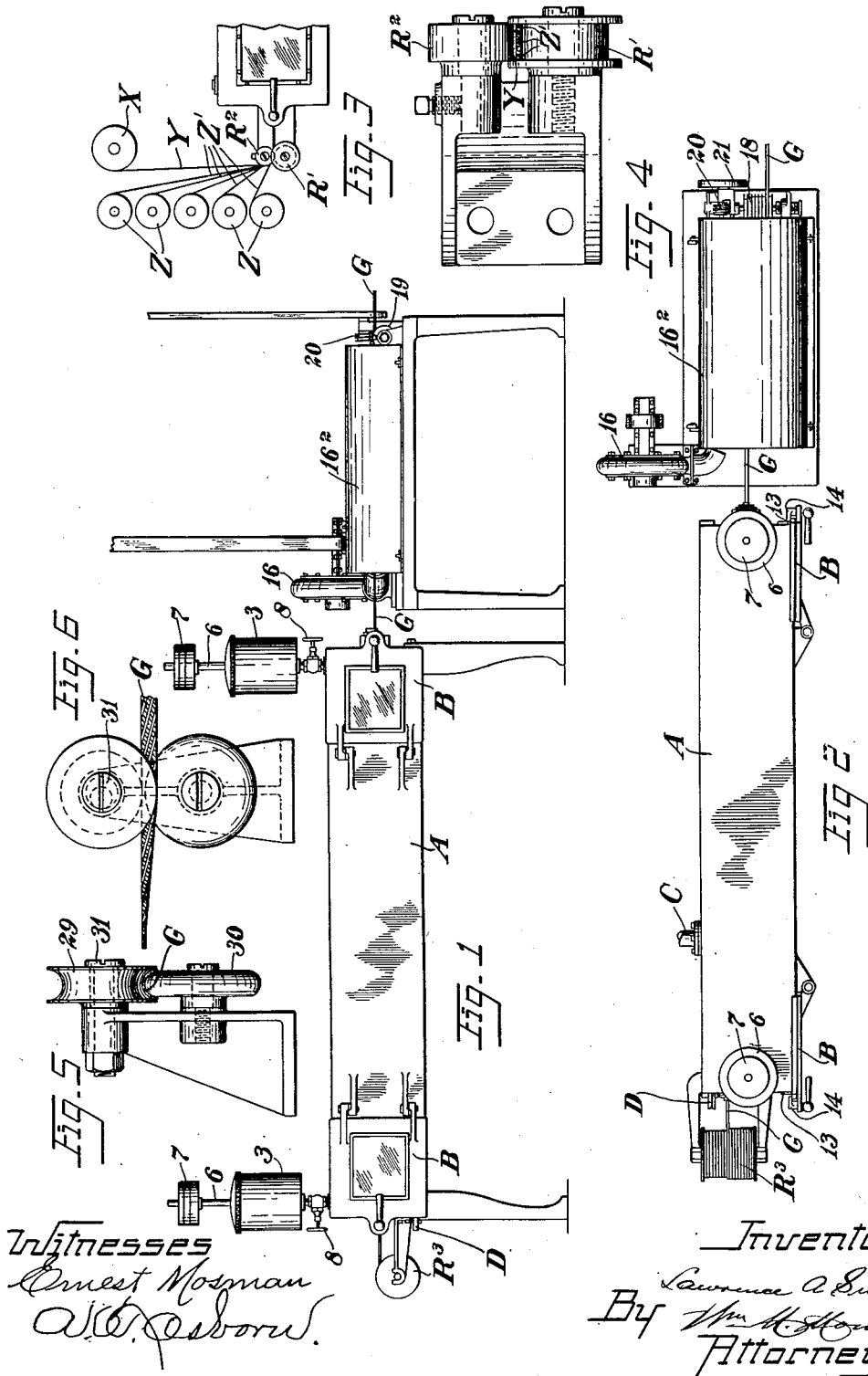


L. A. SUBERS.
STRETCHING AND COATING MACHINE.
APPLICATION FILED AUG. 17, 1914.

1,234,704.

Patented July 24, 1917.

4 SHEETS—SHEET 1.



Witnesses
Ernest Mosman
W. C. Osborn.

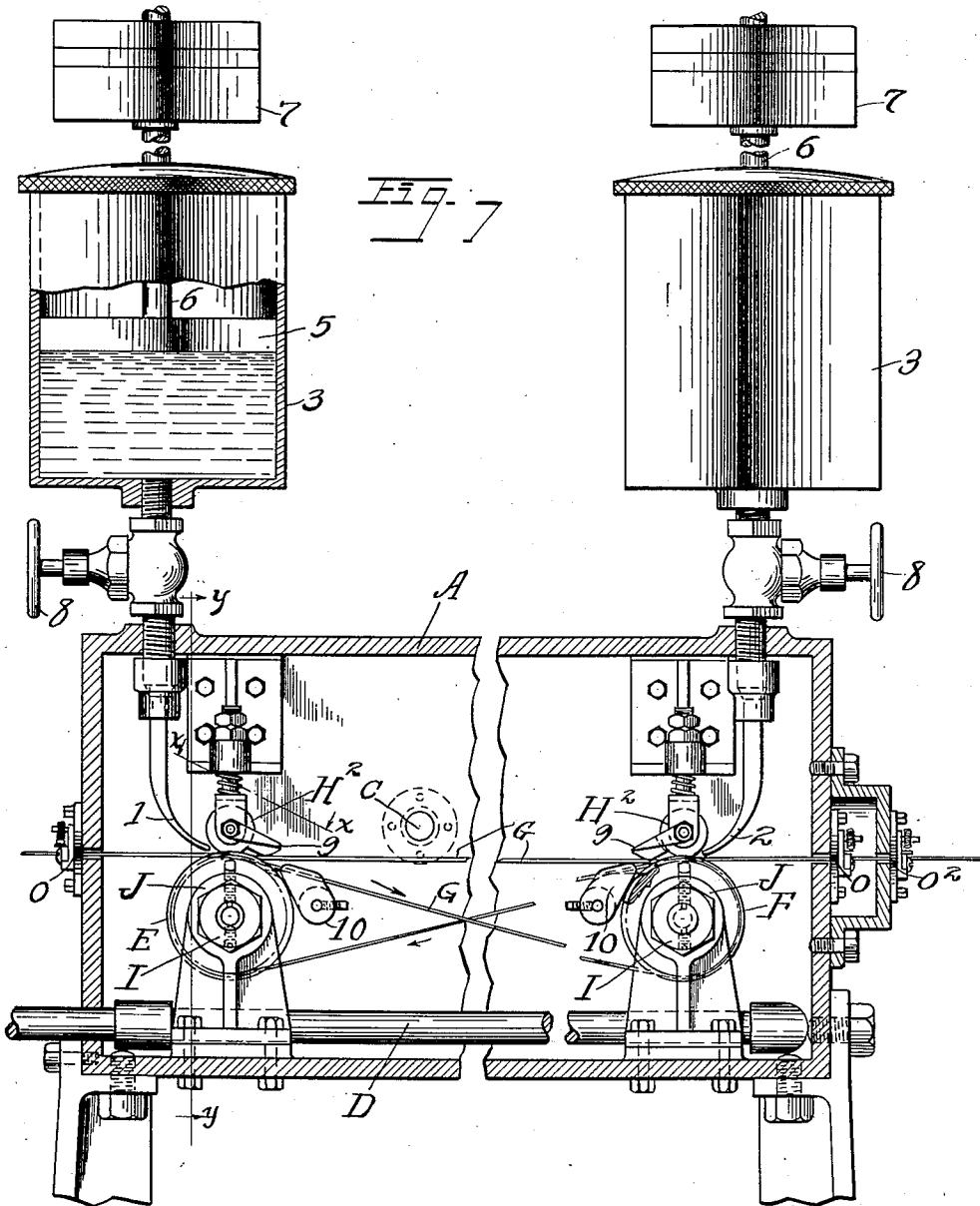
Inventor
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4 SHEETS—SHEET 2.



Witnesses
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A. C. Osborn.
FIG. B

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Att'y

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4 SHEETS—SHEET 3.

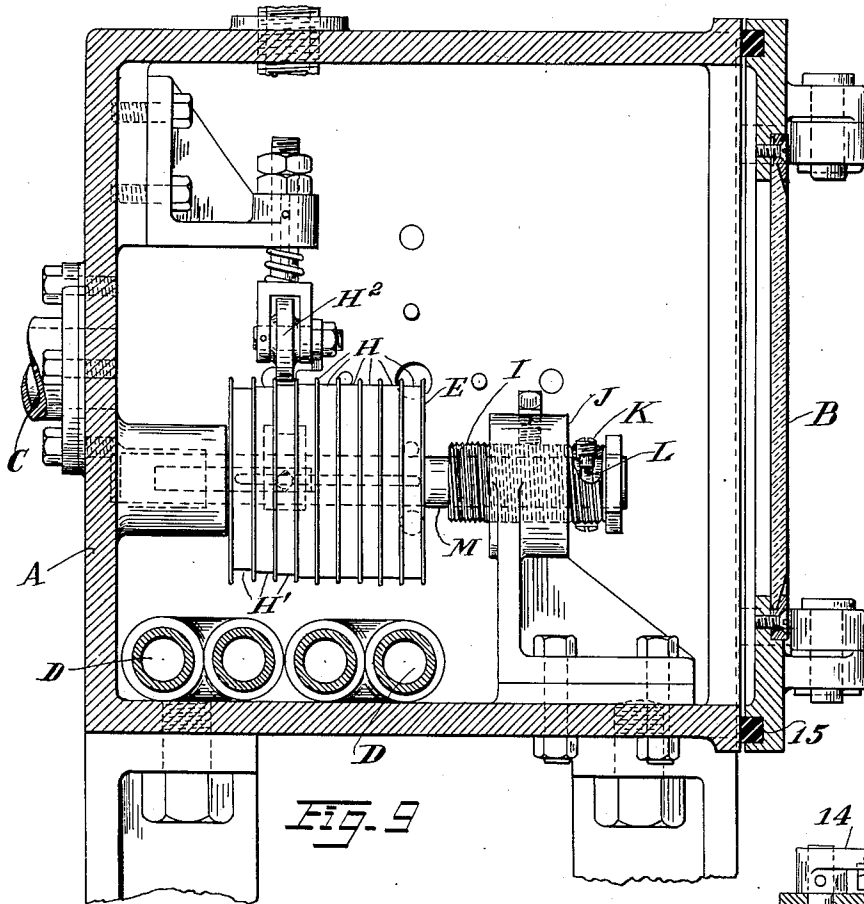


Fig. 9

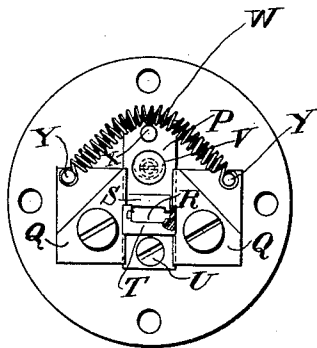


Fig. 10

Witnesses
Ernest Mosman.
A. C. Osborn.

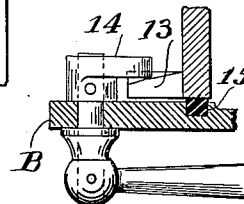


Fig. 11

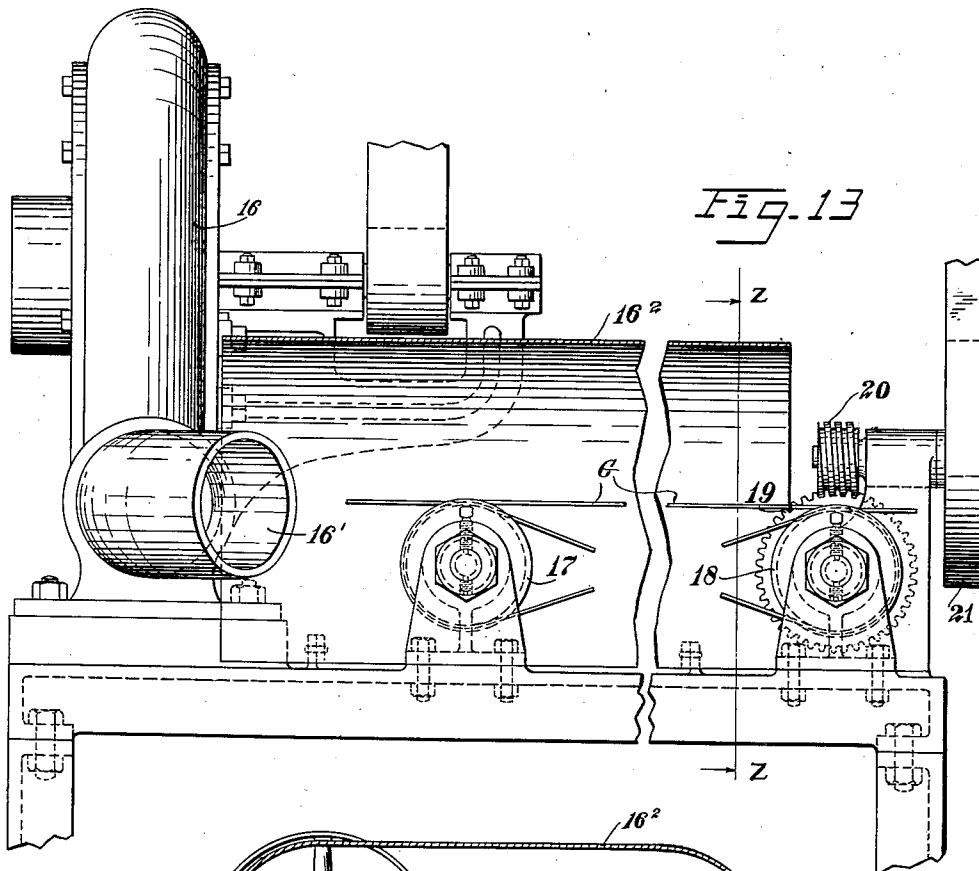
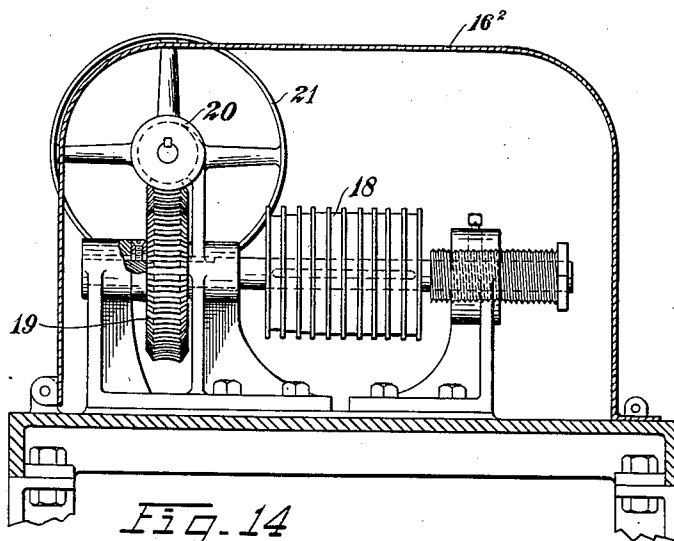
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4 SHEETS—SHEET 4.



Witnesses

Ernest Morgan
W. C. Brown

Inventor

Lawrence A. Subers

By *W. W. Moore*
Attorney

UNITED STATES PATENT OFFICE.

LAWRENCE A. SUBERS, OF EAST CLEVELAND, OHIO.

STRETCHING AND COATING MACHINE.

1,234,704.

Specification of Letters Patent.

Patented July 24, 1917.

Substitute for application Serial No. 770,053, filed May 26, 1913. This application filed August 17, 1914.
Serial No. 857,072.

To all whom it may concern:

Be it known that I, LAWRENCE A. SUBERS, a citizen of the United States, and resident of East Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Stretching and Coating Machines, of which I hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

It will be understood that this present application is a substitution for my prior application #770,053.

The objects of the invention are to provide a device for compressing, forming, stretching and coating a band of fabric with fluid rubber or other adhesive material and includes a heated vacuum chamber in which the rubber is applied as well as a cooling chamber supplied with a cold air blast.

The invention also includes combined cylindrical and tapered stretching arms and pressure rolls, means for scraping the rubber from the rolls and drums into the fabric, and means for providing approximately air tight gate ways or closures for the vacuum chamber where the fabric passes through, to prevent the entrance of air and in the outlet position to prevent the air from entering and tending to strip the rubber from the fabric.

The invention also includes the combination and arrangement of parts and construction of details as hereinafter described, shown in the accompanying drawings and specifically pointed out in the claims.

In these views Figure 1 shows a side elevation of a machine for compressing, forming, stretching and coating a band of fabric; Fig. 2 is a plan view of the same; Fig. 3 shows five cords and a flat band of fabric formed into one band ready for introduction into this machine; Fig. 4 is an end elevation (enlarged) of the same; Figs. 5 and 6 show edge and side views respectively of forming rolls for giving final shape to the band after passing through the machine; Fig. 7 is a longitudinal broken section of the portion of the machine in which the band is coated and stretched, and shaped and heated, showing a heating coil, and a pipe connection for a vacuum producing apparatus, and a double vacuum protection at the outlet end. Fig. 8 is a transverse section taken on

line $x-x$ Fig. 7, of one of the scrapers which scrape off superfluous rubber from the rolls; Fig. 9 is a transverse section on line $x-x$ Fig. 7, showing the first combined taper and cylindrical stretching drum and a pressure roll engaging one of the differential grooves in the roll; Fig. 10 is a face view of one of the adjustable closures for the openings in the wall of the drying chamber, and means for making the opening substantially air proof; Fig. 11 is a longitudinal section thereof; Fig. 12 is a section of wall of vacuum chamber showing a wedge shaped latch for closing the door tightly; Fig. 13 illustrates the pulling device, the drying and cooling chamber and an air blast there-through and also shows motive power for pulling the band through the machine; Fig. 14 is a transverse section thereof on line $z-z$ Fig. 13 showing a side view of the pulling roll and the motive power therefor.

In these views A is a vacuum chamber provided with sealed doors B and with a suction pipe C which may be connected with any suitable suction device. Within these chambers is shown a heating coil D and at opposite ends are shown tensil or stretching drums E and F respectively, over which the fabric band G passes. These drums are spaced the entire length of the machine apart, so as to expose a large surface of the band to the influence of the heat from the steam pipe and to the exhausting effect of the vacuum chamber. Each reel is provided with a number of sections H of equal diameter and with a specified number H' of less diameter each of slightly less diameter than the preceding section.

These drums are oppositely placed and the effect of the sections of constantly reduced diameter upon the band is to stretch each wrapping tightly until a predetermined amount of elasticity has been withdrawn therefrom without injury to the fiber. Upon one of these sections in each drum is mounted a spring pressed roller H² which serves to tightly engage the band with the surface of the drum. Each drum is adjustably mounted by means of a screw threaded sleeve I in a bearing J and a screw K in the sleeve engages an annular groove L in the shaft M of the drum.

The band enters through an automatically closing gate O at one end of the chamber

and has its exit through two gates O' and O² spaced apart respectively at the other end of the chamber.

Each gate comprises a sliding block P inclosed between guides Q, the gate having an opening R for the passage of the band, and a stationary block T secured by screw V. The sliding block P is adjustable toward or away from the stationary block T by means of the eccentric pin V which is shaped so as to be grasped by the fingers. Except when adjusted to its maximum upward position by the eccentric pin V, the block P is free to move upward to this maximum position against the action of the spring W on the pin X attached to the moving block P. The spring W has its ends fastened to the pins Y on the guides Q.

The object in providing two gates at the outlet end of the chamber is to form a double protection at this point and exclude air as completely as possible from the rubber coated fabric, since air entering under pressure at this end would tend to strip the soft rubber coating from the fabric.

At 1 and 2 are shown nozzles for applying rubber coating or other adhesive substances to opposite sides of the fabric as it passes around the stretching drums. Each nozzle communicates with a rubber tank 3 and in each chamber is shown a pressure applying means which comprises a piston 5, a piston rod 6 and a weight 7 sleeved over the piston rod. A valve 8 controls the admission of the flow of rubber to the nozzles.

Adjacent to each drum is shown a scraping device adapted to remove rubber from the drum and from the pressure roller above the drum. These are shown distinctly in Figs. 7 and 8 and are distinguished by numerals 9 and 10 respectively. These scrapers are so shaped as to return rubber that is scraped from the surface of the drum or roller back to the band again.

In Fig. 12 is shown a cam shaped lug 13 upon the edge of the opening in the chamber and 14 is a latch adapted to engage the same to bring the edges of door and chamber closely together. An air tight rubber washer in the edge of the door is shown at 15. The door is preferably supplied with glass so that the interior of the chamber can be seen at all times.

In Figs. 13 and 14 is shown means for applying a blast to the band to thoroughly cool and harden the same so that the band can be handled.

16 is a centrifugal blower, the outlet pipe 16' of which is inclined to direct the blast diagonally across the band so that it will strike the sides of the inclosures 16² through which the band passes. 17 and 18 are grooved pulling wheels by means of which the band is pulled through the vacuum chamber and cooling chamber and the rolls

are operated by means of a worm wheel 19, and worm 20, and a pulley 21, and are similarly grooved to the stretching drums before mentioned, and are adjustable in their bearings in a similar manner so that the grooves may be made to coincide with the grooves in the stretching drums.

In Figs. 3 and 4 are shown means for supplying a modified form of band (as shown in application for Letters Patent Serial No. 587629 consisting of a series of twisted cords and a flat band formed into a unit) to the compressing, forming, stretching and coating machine. Here X is a reel upon which the band Y is roller and Z, Z are reels for thread Z'. These pass through a grooved roller R' underneath an entering roller R² and are thereby closely held together until they enter the machine for stretching and coating.

In Fig. 1 the band is fed from an ordinary reel R³. In Figs. 5 and 6 is shown a device composed of upper and lower forming rolls 29 and 30 shown as the concave and convex respectively, for shaping the completed fabric G as for employment in a clencher tire. One of these rollers is provided with an eccentric shaped screw or pin 31 by means of which the pressure can be adjusted.

Having described the invention what I claim as new and desire to secure by Letters Patent is:

1. The combination with a vacuum chamber, of a heating means therein, a pair of stretching drums therein, over which a band is wound, adjustable gates in opposite walls of said chamber through which said band passes, and means for applying a coating of fluid rubber or other adhesive material to both sides of said band.

2. In a device for the purpose set forth, a vacuum chamber, a heating coil therein, a pair of grooved stretching drums therein, one at each end of the chamber, over which a band of fabric is wound, said band crossing intermediate of said drums, a tube over each drum adapted to supply liquid rubber or other adhesive substance thereto, a receptacle adapted to supply fluid rubber to each tube, and means for placing the rubber under pressure therein.

3. In a device for drying and stretching a fabric band and applying a coating of rubber or other adhesive material to both sides thereof, a vacuum chamber, a pair of spaced grooved stretching drums therein over which the band passes and is crossed between them, an adjustable gate through which the fabric passes into the chamber, a pair of adjustable gates spaced apart through which the band has its exit, nozzles arranged to apply fluid rubber to the crossed band, said nozzles being adjacent to said drums whereby the band is coated on

both sides, and heating coils in said chamber.

4. In a machine for coating, stretching and drying a fabric band and afterward coating the same, a vacuum chamber, a heating means therefor, a pair of spaced stretching drums over which the band passes, nozzles adapted to apply fluid rubber or other adhesive substance to each side of the band, gates in the walls of the chamber through which said band passes, a pulling device for the band, means for delivering a cooling blast upon the band, and an inclosure for the band while being cooled.

5. In a coating, stretching and drying device for a fabric band, a vacuum chamber, a heating means therein, a pair of stretching drums spaced apart in said chamber, a pressure roller for each drum, means for applying a coating of fluid rubber or other adhesive material to each side thereof, and means for scraping the rubber from said drums and rollers and for returning the same to said band.

6. The method of applying liquid ma-

terial to a band which comprises carrying the band around a pair of parallel drums and crossing the band intermediate the said drums to present opposite sides of the band to view on the opposite drums, and applying liquid material to said band on both sides thereof at the point where said sides are exposed near the top of said drums.

7. The method of applying liquid material to a band which comprises winding a band around a pair of parallel drums and crossing said band intermediate said drums to present opposite sides of the band to view on the opposite drums, applying liquid material to both sides of said band near the point where it passes over the top of said drums, and pressing the band against the drums immediately after the application of the liquid material thereto.

In testimony whereof, I hereunto set my hand this fourteenth day of August 1914.

LAWRENCE A. SUBERS.

In presence of—

ERNEST MOSMAN,
A. T. OSBORN.