J. MEADE.

APPARATUS FOR CONDITIONING ADHESIVE COATED FABRIC.

APPLICATION FILED JULY 3, 1909.

1,035,218.

Patented Aug. 13, 1912.

2 SHEETS—SHEET 1.

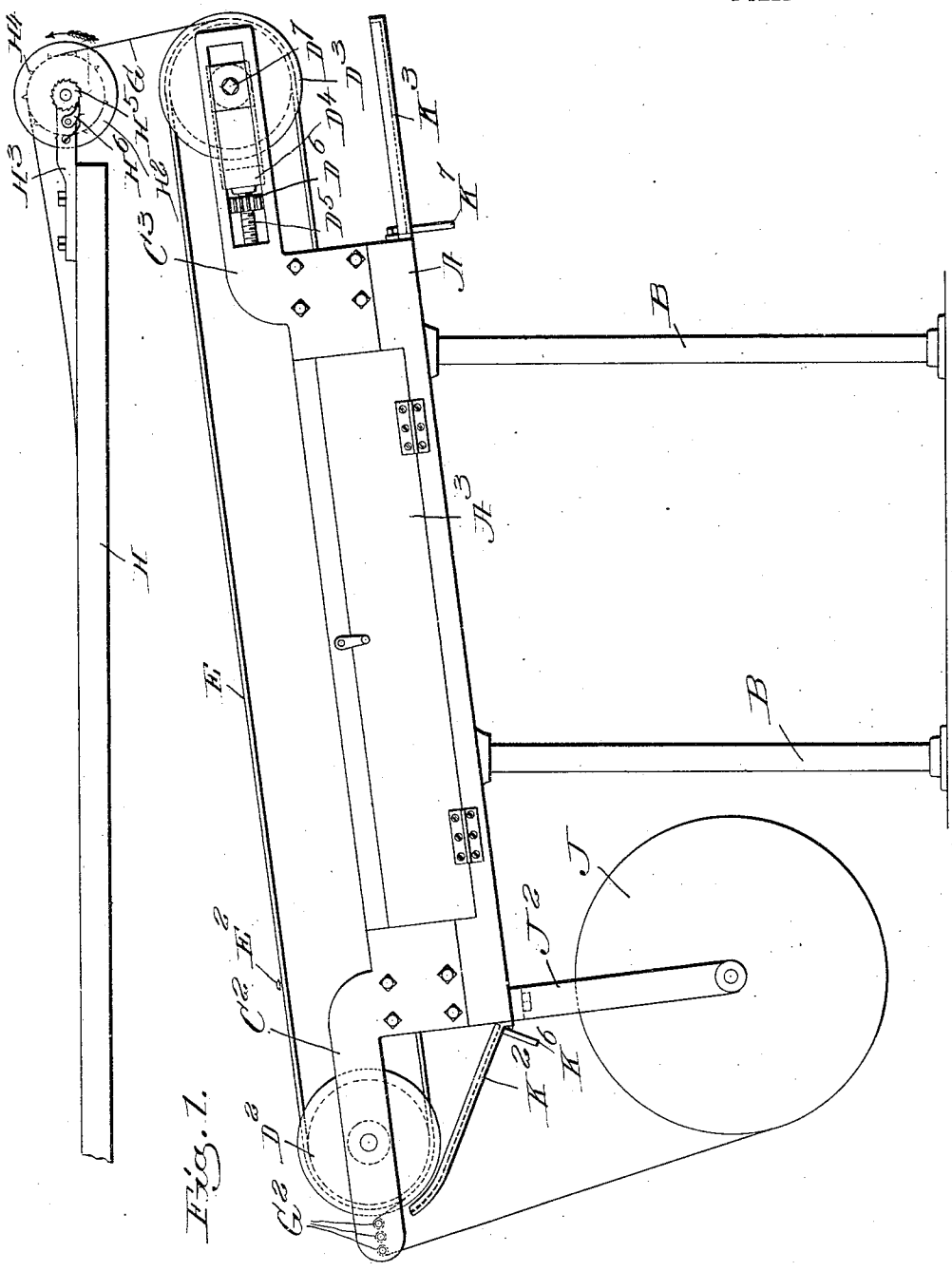

Fig. 1.

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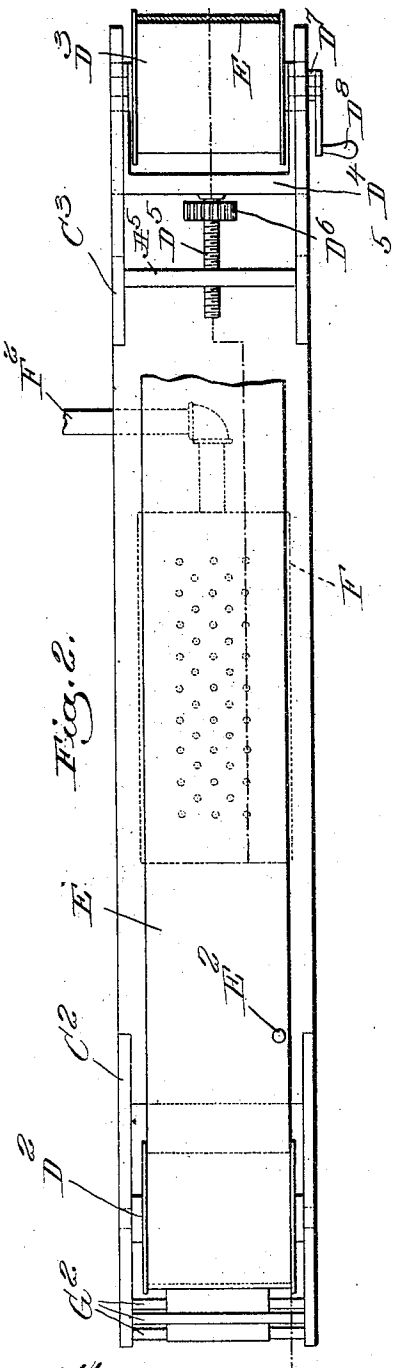

Fig. 2.

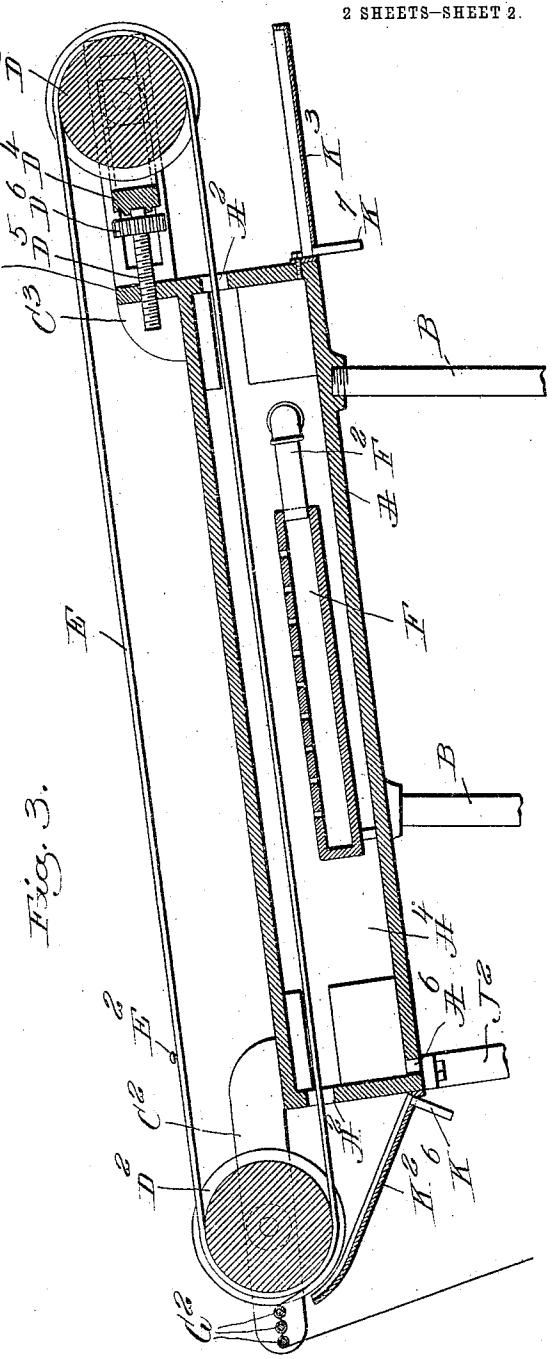

Fig. 3.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR CONDITIONING ADHESIVE-COATED FABRIC.

1,035,218. Specification of Letters Patent. **Patented Aug. 13, 1912.**

Application filed July 3, 1909. Serial No. 505,845.

To all whom it may concern:

Be it known that I, JAMES MEADE, a citizen of the United States, residing at Stoughton, county of Norfolk, State of Massachusetts, have invented an Improvement in Apparatus for Conditioning Adhesive-Coated Fabric; of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to an apparatus or machine for placing adhesive coated fabric in suitable condition for application to leather or other material such as used in the manufacture of inner soles for shoes. The apparatus is particularly designed for treating that class of adhesive coated fabrics in which the coating has its tacky or sticky qualities due to the presence of gutta percha or other vegetable gums, or equivalent materials used in the rubber coating trade for producing an adhesive coating. In this class of adhesive coated fabrics the coating is normally dry and non-adhesive so that the fabric can be rolled up without sticking together and can be handled without difficulty. The foundation fabric upon which the coating is applied varies in weight and weave according to the purpose for which the coated fabric is to be used. This adhesive coated fabric has found a large use, more particularly in recent years, in the manufacture of inner soles for shoes where a comparatively thin and cheap leather is reinforced by a layer of fabric cemented thereto. Types of such inner soles are known as the "Sleeper," one form of which is described in the patent to Sleeper, No. 563,083, granted June 30, 1896, and the "Gem" described in patent to Cole, No. 575,460, granted January 19, 1897. In the manufacture of such inner soles by the use of previously prepared adhesive coated fabric, such as referred to, it has been common to place the coated fabric in condition for application to the base of the inner sole by wetting or moistening the fabric itself and by heating the coating; the wetting or moistening of the fabric being primarily for the purpose of rendering the fabric pliable or flexible so that it would more readily conform to any irregularity in the surface to which it was applied, such as the projecting rib of the inner sole, and the heating of the coating being primarily for the purpose of rendering it tacky or sticky. This wetting or moistening of the fabric has been secured usually by passing the entire coated fabric through a bath of hot water or live steam, while the heating of the coating has been performed by the subsequent application of dry heat.

The present invention provides for the conditioning of the adhesive coated fabric without wetting or moistening the fabric or subjecting the strip of material to more than one operation. It has been found that the adhesive coated fabric can be rendered sufficiently pliable without the fabric itself being wet or moistened, provided that the substance of the coating is in a thoroughly soft and flexible condition. The presence of the coating on the fabric is what renders the material as a whole stiff and heavy, as is shown by the fact that in the old methods of making the "Sleeper" and "Gem" inner soles when these adhesive coatings were not employed no trouble was experienced in regard to the pliability of the fabric.

In the apparatus of the present invention the coating only is treated to render it soft throughout, thus giving the entire material great flexibility, and to render it tacky or sticky, thus presenting the material in condition to stick readily to the base of the inner sole. This conditioning of the fabric is secured by passing it through what is herein termed a conditioning chamber with its back or uncoated surface in close contact with a traveling support or belt, and with its face or coated side in the presence of steam. When thus conditioned by the machine of this invention the coated fabric emerges with its fabric portion in a dry condition and with its coated surface tacky or sticky and with its entire body so flexible and pliable that it may readily be bent into any desired shape to conform to the desired irregular surface.

The elimination of the wetting or moistening of the fabric itself is an important matter because such moistening is often injurious not only to the fabric itself but also to the article to which it is applied. In the manufacture of inner soles the moistening often produces mildew spots upon the inner sole and frequently rots and stains either or both the leather and the fabric; again, it is often difficult properly to dry the inner soles after they are assembled, thus increasing the tendency to the rotting or injury of

the parts; again, when the inner soles are properly dried so much time and space is required as to be very objectionable; again, the application of moisture to the fabric itself serves to remove therefrom the major or substantial portion of the sizing usually contained in such fabrics and which gives "body" to the fabric; again, the inner soles cannot be made up or welted into the shoe until they are thoroughly dry except by considerable difficulty. The elimination of the moistening of the fabric, therefore, secures a number of advantages and also enables the use of a less heavy and, consequently, less expensive fabric while preserving the necessary degree of stiffness or "body".

The apparatus of the present invention not only eliminates the wetting or moistening of the fabric itself, while at the same time conditioning the coated surface so that it is rendered tacky or sticky and the fabric as a whole pliable and flexible, but it secures the conditioning of the fabric in such a way that it may be handled without difficulty but will stick with great tenacity when pressed into contact with the leather surface of the base of the inner sole. The action of the steam alone upon the coated surface is found to condition the coating in precisely the required degree. The fabric as it emerges from the machine is not harsh and heavy as when wetted but is light and flexible, and the coating being tempered by the moisture of the steam can easily be handled. No drying of the fabric is required and it is ready for use in the manufacture of the inner soles and of the shoes immediately. When the fabric thus conditioned is applied to the face of the inner sole it rests across the top of the ribs and does not flop down onto the "feather" edge nor contact therewith until it is fitted into place, nor does it stick so firmly to the rib as to pull it down out of place until it is fitted thereto—difficulties which have been found to occur previously. The fabric thus conditioned and applied to the inner sole allows the inner sole to slide readily through the so-called "gemming" machine which presses the fabric into close contact with the irregular surface of the inner sole. Immediately after the inner sole has been gemmed and finished it is ready to pass to the subsequent operations of the making of the shoe without further drying or attention.

The machine is not only economical in its construction but is also economical in its maintenance, chiefly because it only requires for its operation exhaust steam, or steam under very low pressure since it is found that such steam is sufficient to condition properly the coating. In machines hitherto employed for treating adhesive coated fabric steam under high pressure has been employed in the machines at considerable expense. This live steam, or steam under high pressure has been required not only to maintain the temperature of the water to provide the bath through which the fabric was passed to wet or moisten the fabric, but also to heat a drum or steam chest and thus provide an intense dry heat for softening the coating. The present machine simply applies exhaust steam, or steam under low pressure directly to the surface of the coating alone and is found to secure the desired result.

Besides the essential features of this invention already referred to it comprises certain subordinate features such as the means for maintaining the fabric in contact with the belt or traveling support, the means for taking up the slack in the endless belt or support, and the general arrangement of the parts of the machine, all of which will be more fully described in the accompanying specification and particularly pointed out in the claims.

The drawings show the preferred form of apparatus embodying this invention and designed for the conditioning of a narrow strip of adhesive coated fabric such as is used in the manufacture of inner soles for shoes.

In the drawings Figure 1 is a side elevation of the entire apparatus. Fig. 2 is a top-plan view. Fig. 3 is a side elevation of the main portion of the apparatus partially in vertical cross section.

The body of the machine is preferably of a flat, box-like form and may be constructed of any suitable material but is preferably formed of cast-iron. It is of sufficient width to allow the passage therethrough of the strip of coated fabric, of sufficient length to enable the fabric to be properly conditioned and of sufficient depth to allow of the interposition of the steam-spraying device beneath the line of passage of the fabric. This box is indicated at A and is supported in a slightly inclined position to drain off the moisture from the steam by suitable standards or uprights B. The box is slotted at A^2 at each end and provided at one side with a door A^3 by which access may be had to its interior. A pair of bearing arms C^2 at one end and another pair of bearing arms C^3 at the opposite end are formed upon or attached to body A and serve as supports for flanged rolls D^2, D^3 journaled therein and arranged with the lowest points of their peripheries in line with the slots A^2.

One of each pair of bearing arms is preferably removable and bolted in place as indicated in Fig. 1 to cover the front side or end of the slots A^2 to enable the belt E to be in position.

The belt E is of endless construction and formed of any suitable material capable of presenting a smooth surface and withstand-

ing the action of the steam, and preventing the access of heat and moisture to the uncoated side of the fabric. Preferably a heavy belt made of rubber and canvas and of endless form is used. The belt passes around the rollers D^2 and D^3 and through the slots A^2, the lower run of the belt thus extending through the conditioning chamber A^4 or interior of the body A, while the upper run extends outside of the body through the atmosphere. Provision is made for taking up slack in the belt by having the journal of one of the rolls as D^3 mounted to move longitudinally in the bearing arms, and an adjusting device is provided for securing this movement. Such an adjusting device is herein shown as a yoke D^4 sliding in the bearing arms and abutting against the ends of the journal of the roll D^3 and a screw D^5 screwed into a web A^5 projecting upwardly from the forward end of the body A, which screw abuts against yoke D^4 and is provided with a milled head D^6 by which it can be readily turned.

The interior of the body or the conditioning chamber A^4 is provided with a steam spray device herein shown as a flat, rectangular box F placed beneath the lower run of the belt E perforated throughout its upper surface to direct the steam in the direction of the belt and connected with a steam supply pipe F^2 which is preferably an exhaust pipe. The strip of coated fabric illustrated at G in Fig. 1 is held in place against the lower run of the belt with its uncoated surface in close contact with the belt by suitable means which will allow of it traveling along with the belt. Such means are shown as a plurality of friction rolls G^2 located on the bearing arm C^2 and a roughened or spiked ratchet roller mounted on the end of the work-table above the opposite end of the apparatus, but any suitable device may be employed for this purpose.

The work-table is shown at H and the arrangement is such that the entire apparatus may be placed beneath the work-table, thus occupying the minimum amount of room and requiring, in fact, no additional room from that required by the work-table.

The ratchet roll is shown at H^2 journaled in brackets H^3 bolted to the table H. The surface of the roll is provided with the roughnesses or spikes H^4, and a ratchet H^5 on the roll coöperates with a spring-pressed pawl H^6 on the brackets H^3 so that the roll can only move in the direction of the arrow.

The roll of fabric J is supported in any suitable manner as upon brackets J^2 depending from the rearward end of the apparatus.

In threading up the apparatus the end of the strip of fabric from the roll J is first carried back and forth between the friction rolls G^2 and then attached to the lower run of the belt E, a button E^2 being provided upon the belt which may be put in a slot cut in the strip of fabric. The forward roll D^3 has its shaft provided with a squared end D^7 adapted to receive a removable handle D^8. Upon the turning of the handle D^8, therefore, the strip of fabric will be drawn through the conditioning chamber. The end of the fabric is then passed around the roll H^2 and laid upon the table H.

In the operation of the machine the end of the fabric is pulled until tension between roll H^2 and friction rolls G^2 holds the back of the fabric snugly up against the surface of the belt E. Steam is then admitted through the pipe F^2 into the spraying box F whence it issues against the coated surface of the strip of fabric in the conditioning chamber. The action of the hot steam, which need not be under pressure but may simply be an exhaust, is to place the coated fabric in just the proper condition by rendering the coating sticky or tacky and thoroughly softened throughout. As the fabric is needed it is pulled by hand along the table H and cut off in desired lengths and applied to the inner sole. As it is pulled along the ratchet roll H^2 is rotated maintaining the fabric snugly up against the belt, thus keeping the fabric portion dry and the reverse rotation of the roll H^2 is prevented by the pawl.

Any moisture which may adhere to the surface of the strip of fabric at the entrance to or exit from the conditioning chamber will be condensed and to prevent its dropping upon the floor trays or pans K^2, K^3 are provided. Drainage ports A^6, K^6, K^7 are provided respectively for the conditioning chamber and the two drip pans K^2 and K^3 to which suitable pipes may be attached if desired.

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

1. A machine for conditioning adhesive coated fabric comprising, a conditioning chamber provided with openings for the passage of a strip of coated fabric therethrough, and means for protecting the uncoated side of the fabric throughout during its passage through the conditioning chamber whereby the adhesive coating is thoroughly conditioned without wetting the fabric.

2. A machine for conditioning adhesive coated fabric comprising, a conditioning chamber provided with openings for the passage of a strip of coated fabric therethrough, means for protecting the uncoated side of the fabric throughout during its passage through the conditioning chamber, and means for admitting steam to said conditioning chamber whereby the adhesive

coating is thoroughly conditioned without wetting the fabric.

3. A machine for conditioning adhesive coated fabric comprising, a conditioning chamber, a traveling support presenting an unbroken surface extending through said chamber, means for maintaining that portion of the coated fabric within the chamber in contact throughout its uncoated side with the traveling support during its passage through the chamber, and means for admitting steam to said conditioning chamber whereby the adhesive coating is thoroughly conditioned without wetting the fabric.

4. A machine for conditioning adhesive coated fabric comprising, a conditioning chamber, a traveling support presenting an unbroken surface extending through said chamber, means for maintaining that portion of the coated fabric within the chamber in contact throughout its uncoated side with the traveling support during its passage through the chamber, and a steam spraying device located in said conditioning chamber beneath said traveling support.

5. A machine for conditioning adhesive coated fabric comprising, a conditioning chamber provided with oppositely disposed openings, a flexible endless belt presenting an unbroken surface and supported adjacent said chamber with its lower run extending through the conditioning chamber and the openings thereof, means for maintaining that portion of the coated fabric within the chamber in contact throughout its uncoated side with the lower run of the belt, and means for admitting steam to said conditioning chamber.

6. A machine for conditioning adhesive coated fabric comprising, a substantially horizontally elongated conditioning chamber, a steam spraying box located therein, an endless flexible belt presenting an unbroken surface, guiding devices to maintain and direct the lower run of the belt through the chamber above the steam spray box, and means for maintaining that portion of the coated fabric within the chamber in contact throughout its uncoated side with the lower run of the belt.

7. A machine for conditioning adhesive coated fabric comprising, a body portion presenting a conditioning chamber therein and provided with oppositely disposed openings, projecting bearing arms at the opposite ends of said body portion, rolls mounted in said bearing arms, an endless flexible belt presenting an unbroken surface and mounted on said rolls and having its lower run extending through the conditioning chamber and the openings thereof, and means for admitting steam to said conditioning chamber.

8. A machine for conditioning adhesive coated fabric comprising, a body portion presenting a conditioning chamber therein and provided with oppositely disposed openings, projecting bearing arms at the opposite ends of said body portion, rolls mounted in said bearing arms, an endless flexible belt presenting an unbroken surface and mounted on said rolls and having its lower run, extending through the conditioning chamber and the openings thereof, drainage pans located beneath the projecting portions of the belt extending beyond the openings in the body portion, and means for admitting steam to said conditioning chamber.

9. A machine for conditioning adhesive coated fabric comprising, a body portion provided with a conditioning chamber having oppositely disposed openings therein, rolls mounted at opposite ends of the said body portion, a table above said body portion, a roughened ratchet roll mounted at the end of the table above the forward end of the body portion and a friction device for the fabric at the rearward end of the body portion whereby the said friction device and ratchet roll act to maintain the fabric with its uncoated side against the surface of the lower run of the belt.

10. A machine for conditioning adhesive coated fabric comprising, a body portion, means for guiding the fabric through said body portion, means for rendering the coating tacky and pliable during such passage, a table above said body portion, a roughened ratchet roll mounted at the end of the table above the forward end of the body portion, over which the fabric passes onto the table and by which the fabric is prevented from slipping backward.

11. A machine for conditioning adhesive coated fabric comprising, a body portion presenting a conditioning chamber provided with oppositely disposed openings, a flexible endless belt presenting an unbroken surface and supported adjacent said chamber with its lower run extending through the conditioning chamber and the openings thereof, means for taking up slack in the said belt, and means for maintaining the coated fabric with its uncoated side in contact with the lower run of the belt in its passage through the chamber.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES MEADE.

Witnesses:
LEONA CHANDLER,
THOMAS J. DRUMMOND.