

(No Model.)

E. BELKNAP.

ROLLER FOR SIZING OR FELTING HAT BODIES.

No. 304,253.

Patented Aug. 26, 1884.

Fig. 1

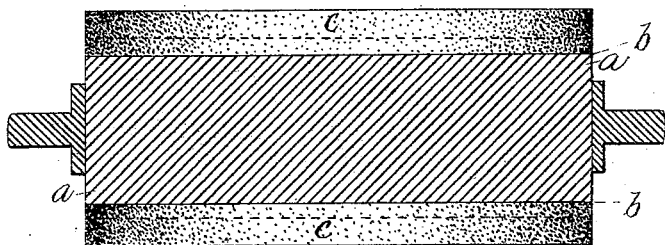


Fig. 2

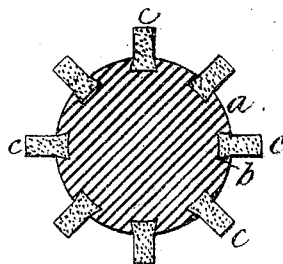


Fig. 3

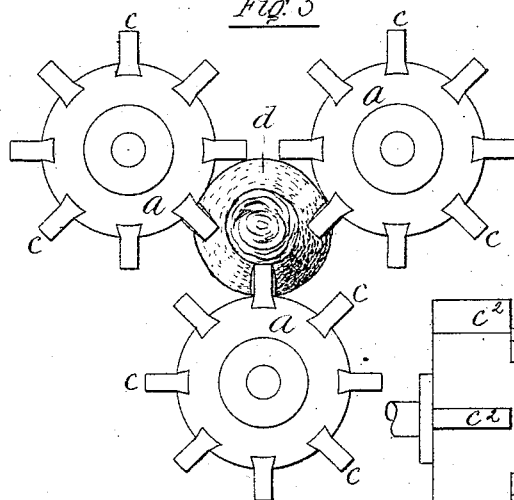


Fig. 6

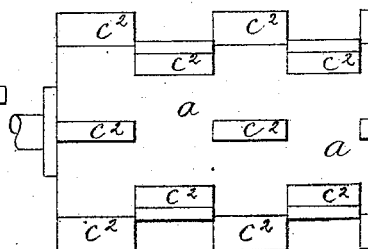


Fig. 4

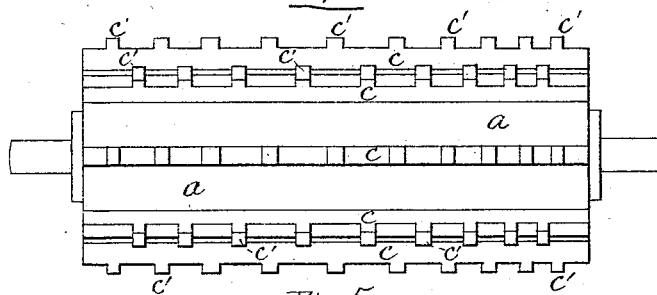


Fig. 5



Witnesses.
A. D. Williams
Chas. Watson

Ethelbert Belknap.
Inventor
per Alfred Theobald
Att'y.

UNITED STATES PATENT OFFICE.

ETHELBERT BELKNAP, OF YONKERS, NEW YORK, ASSIGNOR TO THE
YONKERS HAT MANUFACTURING COMPANY, OF SAME PLACE.

ROLLER FOR SIZING OR FELTING HAT-BODIES.

SPECIFICATION forming part of Letters Patent No. 304,253, dated August 26, 1884.

Application filed May 8, 1884. (No model.)

To all whom it may concern:

Be it known that I, ETHELBERT BELKNAP, a citizen of the United States, residing at Yonkers, county of Westchester, State of New York, have invented certain new and useful Improvements in Rollers for Sizing or Felting Hat-Bodies, of which the following is a specification.

In the manufacture of felt hats the bats, as they come from the blowing or forming machine, are submitted to a sizing or felting process to reduce them to the desired thickness and size. This is done by rolling several bats together in a roll which is thicker in the center than at the ends, due to the conical form of the bats, and placing said hat-rolls between three rollers rotating in the same direction.

Now, this invention relates to certain improvements in the rollers for sizing or felting hat-bodies; and it consists in providing such rollers with elastic ribs so made as to have greater flexibility at their central parts than at their ends, so that they will more easily compress at their parts where they act on the thicker parts of the hat-rolls, and bear on the whole length of the same with a uniform pressure, or with a pressure in proportion to the varying mass of the material in the different parts of the hat-rolls, thus knitting the felt in a better and more regular manner than can be done by rollers having rigid ribs, or ribs having a constant elasticity along their whole length. To carry out this idea I propose to make the ribs which are fixed on the roller or in grooves formed longitudinally or spirally therein of strips of india-rubber so made and vulcanized that they shall have at their ends a certain degree of flexibility, which increases toward their central parts. The ribs may be of any suitable material, or be composed of a system of springs having greater flexibility at the center of the roller. The circumferential edges of the ribs may be plain or provided with a series of projections, and said projections may be larger or more numerous at the ends of the rollers than at the central parts; or the ribs may be in sections, instead of extending the whole length of the roller.

The manner in which my invention is carried out will be fully understood by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a roller for sizing or felting hat-bodies provided with my improved ribs. Fig. 2 is a transverse section of the same. Fig. 3 illustrates by end elevation the manner in which three such rollers are arranged to act on hat-rolls. Fig. 4 is a side elevation of a roller, showing the elastic ribs provided with projections. Fig. 5 illustrates the manner in which ribs of variable flexibility may be made, and Fig. 6 shows a roller having the ribs secured thereto in sections, $c^2 c^2$, which are more flexible at the center than at the ends of the roller.

The body a of the roller is preferably made of wood, having longitudinal grooves $b b$ formed in its periphery.

$c c$ represent strips of india-rubber, fitted in the grooves $b b$ by dovetail connections, as shown; or the grooves may be plain and rectangular, and the strips $c c$ secured therein by a cement or other suitable means. When the ribs $c c$ are made throughout their length of uniform thickness, the material or mixture of materials used is of such a nature as to be more flexible at the central part of the rib than at its end, as before described, which feature is indicated in Fig. 1 by the variation of the tint of the section-marks. When made of india-rubber, then the ribs can be built up with various amounts of rubber in the composition placed in the different parts of the rib, and the whole vulcanized together; or pieces of vulcanized india-rubber having varying amounts of flexibility may be connected together to form the ribs, so as to produce the desired effect; and Fig. 5 is given to show how such india-rubber ribs may be built up either before or after the vulcanizing process. Figures 1 to 5 marked on the sections from the ends to the center indicate the rise of flexibility of the various sections of which the rib is composed.

In Fig. 3, d represents an end view of a roll of hat-bodies placed between three rollers made according to my invention, which are caused to rotate, as indicated by the arrows, by means of any suitable gearing, and one or more of the rollers is or are movable to allow the roll of hat-bodies to be placed between them, as heretofore practiced in this class of machines.

As before mentioned, the elastic ribs may be provided with projections larger or more nu-

merous at their ends than at their centers. Fig. 4 shows ribs *cc* of india-rubber, having projections *c' c'* arranged alternately on the alternate ribs.

5 The variableness of elasticity of the different parts of the ribs of rollers made of an elastic pliable material for the purpose set forth may be produced by making the ribs straight on the top and of a material having a uniform
10 degree of elasticity and pliability throughout their length by reducing the sectional areas of the ribs toward the centers by removing some of the material from the sides or interior of them. Rollers provided with such ribs form
15 the subject-matter of another application filed simultaneously herewith.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

20 1. A roller for sizing or felting hat-bodies, having projecting elastic ribs secured thereto

along their whole length, whose flexibility is greater at the central part of the roller than at its ends, substantially as and for the purpose hereinbefore set forth.

25 2. The combination, with the longitudinally-grooved roller *a*, of the elastic ribs *cc*, made substantially as described, and having a gradually-increasing degree of flexibility from their ends toward their central parts, substantially
30 as and for the purpose hereinbefore set forth.

3. The combination, with the roller *a*, of the elastic ribs *cc*, provided with the projections *c' c'*, substantially as and for the purpose hereinbefore set forth.

35 In witness whereof I have hereunto set my hand, at New York, county and State of New York, this 29th day of April, A. D. 1884.

ETHELBERT BELKNAP.

Witnesses:

ALFRED SHEDLOCK,
H. D. WILLIAMS.