Dec. 28, 1937. E. GLÜCK 2,103,579

ELASTIC BAND

Filed May 13, 1936

Fig. 1.

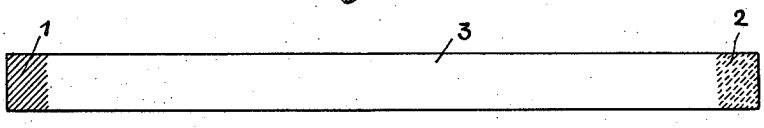



Fig. 2.

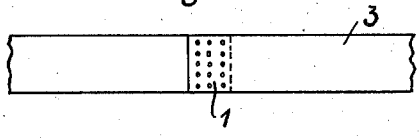



Fig. 3.

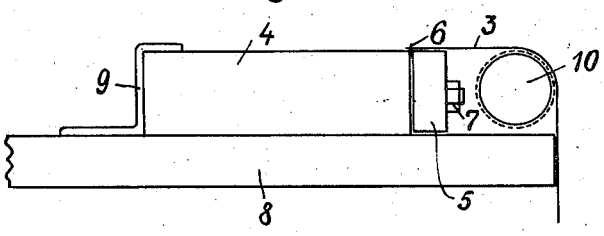
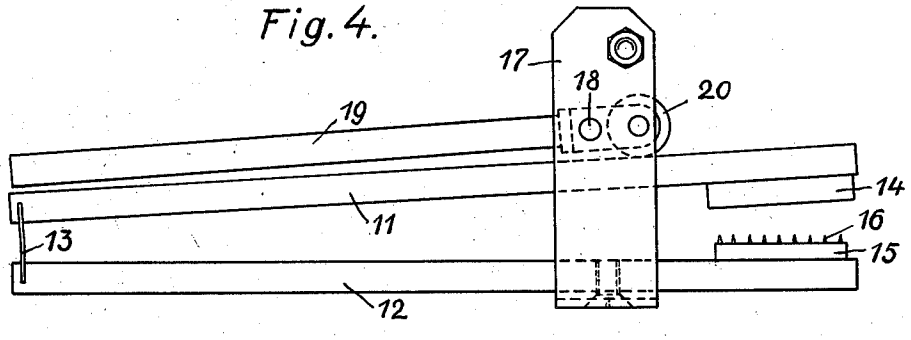



Fig. 4.




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# UNITED STATES PATENT OFFICE

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## ELASTIC BAND

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Application May 13, 1936, Serial No. 79,587
In Germany May 8, 1934

1 Claim. (Cl. 154—42)

This invention relates to an elastic band for holding up stockings, knickers, etc. and to a method of uniting the ends of the band.

It is known to insert elastic bands in the tops of stockings and to unite the ends thereof by sewing or by means of snap fasteners, but this method would not produce the necessary firm and durable connection if applied for instance to rubber bands that are not covered.

It has further been proposed to insert in the tops of stockings during the production thereof seamless elastic bands and to dye the latter together with the stockings. Experience has shown, however, that the rubber is damaged by the dye bath to such an extent that its durability is considerably reduced.

To eliminate the drawbacks mentioned the invention provides the portions of the band ends to be united with a layer of non-vulcanized rubber. As the elastics or rubber bands are vulcanized, the sulfur contained therein gradually passes over into the subsequently applied non-vulcanized rubber layer which thus acquires the properties of vulcanized rubber, particularly with respect to strength and durability. It is an important new knowledge that such cold vulcanization can be effectively carried out and profitably applied to elastics for stockings, since it is possible to provide for a considerable interval between the two operations of putting on the non-vulcanized layer and of uniting the ends of the band.

According to the invention, the juncture of the ends of the band is treated so that the rubber layers penetrate one another in spots and thus cling to one another in such manner that cohesion of the ends directly after their union is insured and the non-vulcanized rubber layers cannot become detached from the vulcanized elastic band. A dependable union of the ends can be attained in a very simple manner by piercing the juncture by means of tongs provided with a large number of needle points.

It is known to render layers of paper, textiles and metal layers adhesive with the aid of dry adhesives to attach the treated portions thereof more or less firmly to other objects. It has been found, however, that the adhesiveness produced does not last and that dry adhesives can be satisfactorily employed chiefly for uniting layers of paper, such as envelopes, parts of postcards, etc. The invention shows that non-vulcanized rubber layers can be used for uniting the ends of elastic bands to be inserted in stockings or other articles.

By way of example, one form of the invention is illustrated in the accompanying drawing, in which Figure 1 shows an elastic band the ends of which are coated with non-vulcanized rubber; Fig. 2 is a top view of a juncture of the ends; Fig. 3 shows means for holding the ends in proper position for applying non-vulcanized rubber layers; and Fig. 4 is a view of the tongs used for uniting the ends.

Referring to the drawing, the two ends 1 and 2 of the elastic 3 are each provided with a layer of non-vulcanized rubber on the sides facing each other when the elastic is closed. Experience shows that these layers will firmly stick to the elastic only if the end portions thereof are previously thoroughly cleaned and roughened, which is of course known per se from the treatment of other objects. To facilitate the application of non-vulcanized rubber to the band ends the latter are secured in perfectly flat condition to a support so as to prevent them from moving. For this purpose a bar 4 is preferably employed to one side of which a number of needles 6 is fixed by means of an auxiliary bar 5, as indicated in Fig. 3. The bars 4 and 5 are connected by the screws 7. To the needles 6 the ends of several elastics 3 are attached side by side in such manner that the portions thereof to be provided with non-vulcanized rubber lie on the bar 5. The bars 4, 5 are then fastened to a support 8 which for this purpose is fitted with the hooks 9. The support 8 further carries a roller 10 which is firmly or rotatably and fixably arranged thereon and which is covered with glass- or sand-paper. The elastics 3 held by the needles 6 are placed on the roller 10 at some tension, and the portions of the elastics disposed on the bar 5 are then thoroughly cleaned and roughened by means of a wire brush to remove the top layer consisting of foreign substances and provided with a non-vulcanized rubber layer. The bars 4, 5 are then removed from the support 8 and kept at a place suitable for drying the layers. After the drying process the bars 4, 5 with the elastics attached thereto can be put again on the support 8 for applying another layer of non-vulcanized rubber, and this may be repeated as often as desired, though three layers will suffice as a rule. The device for holding the elastics in position may be constructed in any suitable manner, but the holding means described has been found to be very satisfactory. When dried the non-vulcanized rubber layer does not feel sticky, and the bands can be shipped without the risk of trouble.

For practical use the elastics are inserted for instance in the tops of stockings after the latter

have been dyed to prevent the elastics from coming into contact with the dye bath. After insertion of the elastics the non-vulcanized rubber layers of each band are superposed and compressed by the tongs shown in Fig. 4, so that the ends of the bands are pierced by the needles 16. The tongs comprise the two side members 11 and 12 connected at one end by a spring joint 13 and provided at the other end with the gripping jaws 14 and 15. The jaw 15 is provided with a plurality of needles 16 the lower portions of which may be cast into the jaw which for this purpose preferably is made of an easily fusible metal like lead. The opposite jaw 14 possesses bores corresponding in number with that of the needles 16 to receive the latter when the side members 11 and 12 are pressed together. To facilitate compression of the legs 11 and 12 a carrier 17 secured to the leg 12 is fitted at 18 with a double-armed lever 19 whose one arm serves as handle while the other carries a roll 20 which rolls on the leg 11 when the lever 19 is moved up and the leg 11 depressed.

To firmly connect the superposed ends of an elastic 3 they are placed on the needles 16, whereupon the lever 19 is turned up to effect tight compression and piercing of the ends. When the lever 19 has been turned down again and the elastic 3 is removed from the needles 16, the ends of the elastic 3 cannot be separated any more by the forces developing during use of the stocking. This is due to the fact that the punctures produced by the needles 16 and indicated in Fig. 2 form, when the pressure of the tongs ceases, a sort of suction cups in which air pressure keeps the ends pressed together. They remain united until subsequently, in the course of the following months, the previously not vulcanized intermediate layer between the two ends is subjected to cold vulcanization starting from the ends and thus a lasting union is insured.

I claim:—

An elastic supporting band of the kind described, comprising a vulcanized rubber strip having the ends thereof overlapped and needle punctured and united by a layer of non-vulcanized needle punctured rubber, the composite having the characteristics of having been pierced after overlapping the ends of the strip.

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