

Aug. 25, 1931.

L. W. JOYCE

1,820,072

OVERALL SUSPENDER ELASTIC

Filed Aug. 20, 1930

Fig. 1.

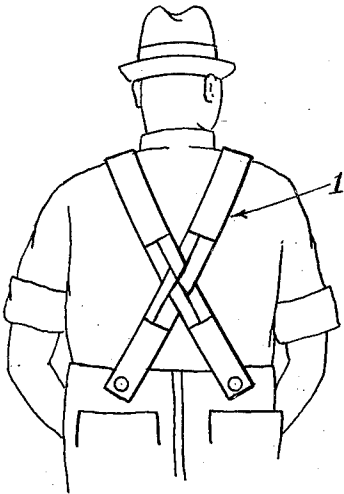


Fig. 2.

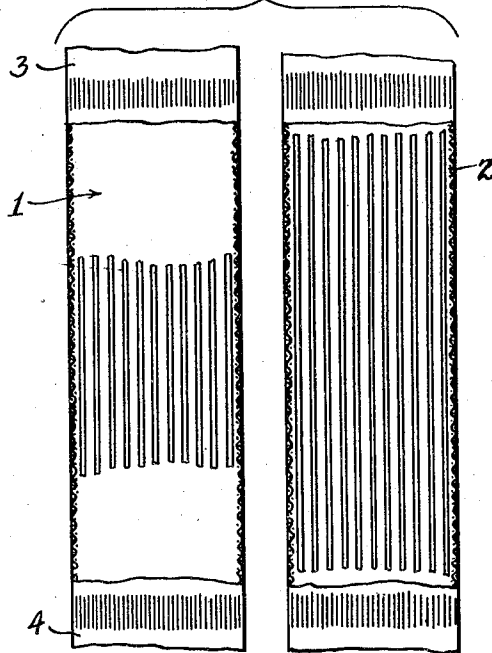


Fig. 3.



Fig. 4.



Fig. 5.

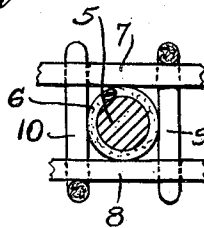


Fig. 7.

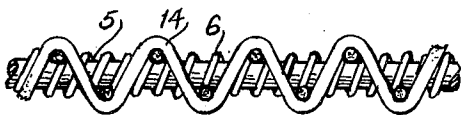


Fig. 6.

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OVERALL SUSPENDER ELASTIC

Application filed August 20, 1930. Serial No. 476,696.

This invention relates to overall suspender elastic and has for its principal object the production of a novel elastic suspender fabric in which the slippage of the rubber strands and their consequent retreat from the ends of the fabric is minimized.

Another object of the invention is the combination with an overall garment of the novel elastic suspender fabric in which it functions in a novel and advantageous manner not possible with overall elastics as heretofore known.

Other objects of the invention will appear as the following description of practical embodiments thereof proceeds, one of these embodiments having been shown and described in my application Serial No. 422,610, filed January 22, 1930, of which the present application is a continuation-in-part.

In the drawings:

Figure 1 is a view in elevation of the related portion of an overall garment showing one point of location of the overall suspender elastic;

Figure 2 is a view in elevation showing by way of comparison a known sample of overall suspender elastic, and one made according to the present invention;

Figures 3 and 4, are respectively, a cross section through the piece of overall suspender elastic shown at the right in Figure 2, and a longitudinal section of the same taken between two of the covered rubber strands;

Figure 5 is a longitudinal section taken at one side of a covered rubber strand in a form of the invention employing a tubular fabric;

Figure 6 is a longitudinal view showing how the warp and weft threads interlock with the helical covering of the rubber strand, when stretched; and

Figure 7 is a section taken along the line 7-7 of Figure 4.

Before advertng to the several figures, it may be stated that I concede it to be old to incorporate covered rubber strands in woven fabric as well as to provide uncovered rubber strands in overall suspender elastic, both of the single ply and tubular type, but it is believed to be a new combination and productive of a new technical effect to incorporate the

covered rubber strands in an overall suspender elastic.

Referring now in detail to the drawings, the numerals 1 and 2 represent respectively, a piece of overall suspender elastic of known construction having uncovered rubber strands, and a piece of overall elastic embodying the principles of the present invention. Figure 2 has been copied from pieces which have been subjected to identical stressing tests in a jerking device, simulating long periods of actual wear.

The piece 1 shows that the uncovered elastic strands have separated from the tabs 3 and 4 to which the pieces were sewn and have crept quite a distance away from the ends of the elastic fabric. The piece 2 shows that the covered elastic strands under the conditions which attend the present invention have not crept nearly so far. The elastic portion of the fabric in the piece 1 is reduced to almost one-third of its original length. The yielding portion of the piece 2 is much more nearly its entire original length.

In that form of the invention illustrated in Figures 3 and 4, a plurality or group of rubber strands 5 are arranged in parallel relation, said strands being covered by a helically wound thread 6 and they are embedded or interwoven by the weft threads 7 and 8 which extend across both sides of the group of the parallel rubber strands. Warp threads are disposed longitudinally of the covered rubber strands, on both sides thereof, said warp threads being interwoven with the weft threads as shown in Figure 4. The result is that the weft threads make contact with the covered rubber strands at substantially diametrical opposite points of the latter as indicated at *a* and *b* in Figure 4, while the portions of the warp threads which extend diagonally between the covered rubber strands intersect at diametrical opposite points and engage said covered rubber strands at the points *c* and *d*, Figure 4.

When the overall suspender elastic is stretched, the helices of the covering of the rubber strands are separated in the manner shown in Figure 6, while at the same time the stretching of the warp threads draws

the weft threads into interlocking relation with said helices at opposite points, while said warp threads themselves are drawn into intimate contact with the helical covering, the warp thread on one side extending in the same oblique direction as the helices of the covering, and becoming interlocked between said helices. The result is that when the covered rubber strand is stretched the surrounding threads of fabric intimately engage and interlock with said covered rubber strands so that it stretches with the fabric but cannot creep relative to the fabric. The strands 14' are merely filler strands of the fabric material and do not concern the present invention.

It will be understood that covered rubber elastic is known in other relations, but that in no instance, insofar as I am aware has it been used in an overall suspender elastic. Its use in this relation calls forth a latent function which is not obvious nor suggested by any of the ordinary or known uses of the covered rubber. For instance, in its use as a men's garter elastic the covered rubber strand will not be stretched sufficiently to cause the separation of the helices of the covering to produce the gripping result required in the present invention. The purpose in a man's garter is to stretch the elastic no more than to secure comfortable adherence. In an overall suspender, the elastic insert is stretched to its elastic limit. It is such excessive stretching that causes the slipping indicated in the left hand side of Figure 2 and in the present invention it is just at this point of excessive stretching that the weft and warp threads close in between the open helices and perform the gripping function which prevents the rubber strand from slipping within the fabric.

A further advantage of a covered rubber strand in an overall elastic is the additional protection which the covering affords against deterioration of the rubber by sunlight.

Figure 5 shows the principles of the present invention applied to a tubular fabric. In this instance there is a separate ply on each side of the covered rubber strand, the plies being constituted by the warp threads 11 and 12 which are interwoven with the weft threads 13. The two plies are united on opposite sides of the rubber strands by binder threads 14 which extend from one side to the other, alternately enmeshing the weft threads. The principle of operation in this instance is the same as with a single ply fabric, the two plies being drawn together against the covered rubber strand when the fabric is stretched and high spots on the inner surfaces of the fabric, produced by the presence of the weft threads on the opposite sides being pressed between the stretched

helices of the covering of the strand, at opposite points.

It is obvious from the above description that in a positive and specific manner the face and back plies in the case of a tubular fabric, of the opposite weft and warp threads in the case of a single ply elastic, cooperate in a new and effective manner with the helices of the covered rubber strand, and through said helices with the strand itself to anchor the rubber at many points, thereby inhibiting its slippage. It is also clear that this novel cooperative function is only performed by the elastic fabric under conditions which are encountered in the use of elastic as an overall suspender insert, and that said use is therefore non-analogous to such uses as do not call for the stressing of the elastic to the point where the principles of the invention will be called into operation.

While I have in the above description shown specific weaves, it is to be understood that the particular means is not essential to the fulfillment of the inventive concept and that variations in the weave may be made without departing from the spirit of the invention as defined in the following claims.

What I claim is:

1. Overall suspender elastic comprising woven fabric in which are frictionally embedded a group of parallel rubber strands each having a helically wound thread covering, said woven fabric comprising weft threads on opposite sides of the group and warp threads at both sides of the group, said weft and warp threads being so interwoven as to push between the turns of said helical covering when said fabric is stretched, at opposite points in a plane perpendicular to said threads.

2. Overall suspender elastic comprising tubular fabric in which are frictionally embedded a group of parallel rubber strands each having a helically wound thread covering, said fabric comprising plies on opposite sides of said group, and warp binder threads running between the strands of said group and interwoven with the weft threads of said plies, said warp binder threads and plies being so disposed as to push between the turns of said helical coverings when said fabric is stretched, at opposite points in a plane perpendicular to said strands.

3. Overall suspender elastic comprising a plurality of spirally covered rubber strands longitudinally disposed in frictionally gripped relation within the weave of a narrow fabric the narrowness of the fabric being such that the weft threads cannot substantially elongate comprising weft threads on both sides of the plurality of strands, each lying on the same face of the plurality of strands throughout the width of the fabric, and warp threads on both sides of each cov-

ered strand, each disposed on its respective side of the strand throughout the length of the strand, said warp threads enmeshing alternately the successive weft threads on each
5 face.

In testimony whereof I affix my signature.

LYNDON W. JOYCE.

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