

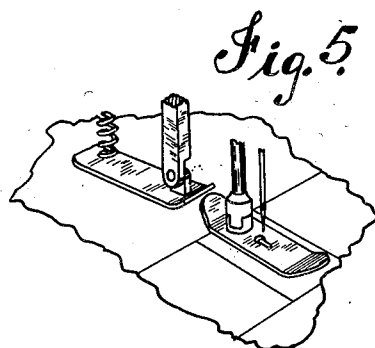
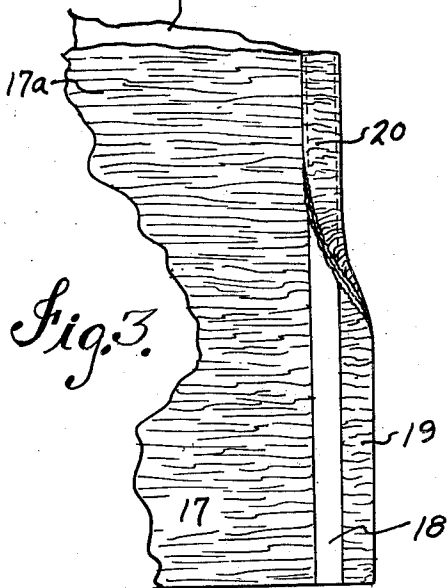
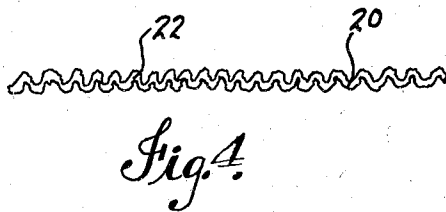
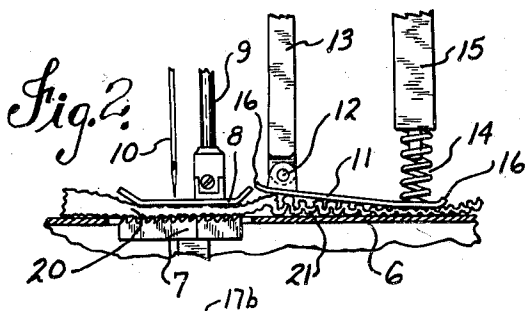
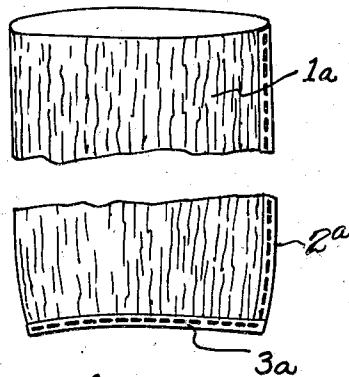
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IMPROVED BAG OR CONTAINER LINER AND PROCESS OF MAKING IT

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## UNITED STATES PATENT OFFICE

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IMPROVED BAG OR CONTAINER LINER AND  
PROCESS OF MAKING ITWilliam Wallace Rowe, Cincinnati, Ohio, assignor  
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My invention has to do with lining structures for bags or other containers, and also shipping covers and case liners, or any seam in creped paper where sewing is across lines of crepe or corrugations. Such lining structures, commonly referred to as "bag liners", "barrel liners" and the like, are usually made of creped paper, waterproofed or not, folded over on itself and seamed upon the bottom and a side to form a bag-like article which, in use, is placed inside another container. There is today a large employment of bag liners for rendering bags of burlap or like pervious material available for the shipment of powdered substances. The liner is slipped within the bag, and not only presents a clean and, if desired, a waterproof surface to the contents, but also prevents sifting and loss of the powdered materials, while the burlap itself makes for strength in the combined structure.

It is necessary to provide a bag liner which is not only substantially as large as the bag into which it is placed, but which has sufficient stretchability to permit the liner to change its shape and give with the bag. Hence the regular employment of creped paper for these liners; and within commercial limits, the greater the inherent stretchability in the liner, the better.

The fundamental objects of my invention are the provision of an improved construction of container liner, and a process of making it, which objects, and others pointed out hereinafter, I accomplish by that construction and arrangement of parts and in that series of process steps, of which I shall now describe exemplary embodiments, reference being made to the drawing, wherein:

Figure 1 is an elevation of a liner embodying my novel construction.

Figure 2 is a partial elevation of a sewing machine arranged for the practice of my preferred process.

Figure 3 is a progressive plan view showing the formation of a seam.

Figure 4 is a corresponding sectional view.

Figure 5 is a perspective view of the machine and arrangement of Figure 2.

My invention will be described in connection with the manufacture of a bag liner, it being understood that it is not restricted thereto. A difficulty inherent in bag liners as heretofore made has resided in a stretching of the bottom seam during the sewing operation, whereby the bottom of the bag liner becomes considerably wider than the body of the liner and also usually wider than the bag into which it must fit. This has made

it very difficult to insert the liners into the bags in such a way that the liners lie perfectly flat within the bags, and without danger of the corners turning over. When the corners are turned over, the effectiveness of the stretch is impaired.

The ordinary bag liner has a body, of creped and waterproof paper folded over upon itself, a side seam, and a bottom seam. The corrugations of the creped paper run lengthwise of the liner, since lateral stretchability is more to be desired. As a natural consequence of the sewing operation, the bottom seam becomes elongated, and in its lower part the bag liner assumes a fan-wise or fish tail conformation which makes it substantially wider than the burlap or other bag which it is to line. The fish tail shape, furthermore, makes the bag liner very difficult to insert into the bag properly. Where universal stretchability is desired in the liner, the material may be one stretchable in all directions, as a creped and corrugated paper, or a paper having crossing sets of configurations imparting stretchability. Under such conditions there will, of course, be a tendency for both seams to become elongated.

The expansion of the seam naturally occurs in the sewing operation as a result of the vertical pressure applied on the seam by the pressure foot and feeding dog of the machine, which action flattens out the corrugations to some extent. It is further due to the tension created when the seam is turned by allowing the feed to pull the paper through the operator's hand and/or the hemmer guide. This stretching action occurs where sewing is attempted transverse to the grain or corrugation of the crepe and substantially does not occur at all in sewing along the line of the creping corrugations in a single-creped or corrugated structure. Consequently the side seam does not become elongated in a liner in which the lines of crepe run only vertically.

In the practice of my invention, I have provided for the first time, a bag liner of creped paper, in which the bottom seam is unexpanded and in the preferred form of my invention is actually contracted so that the seam length is less than the side to side width of the liner. Such a liner is shown in Figure 1, where the bottom seam 3a is shown as substantially narrower than the width of the liner in the body portion 1a. It will be clear that such a liner may be slipped with great ease into a bag which is not itself wider and which may be narrower than the body portion 1a of the liner. Furthermore my novel liners are much easier to handle and form a

neater and smaller package for storage and shipment, not characterized by a fish tail or ruffled construction. It will be understood that the elongation of the bottom seam cannot be fully compensated for by the fish tailing of the sides and that therefore convexities or concavities result. When an attempt is made to press the bottom of such a liner flat, a ruffled construction results and a pile of bag liners will not only be wider, but very much thicker at the bottom than at the top. My novel bag liners stack very easily and form a flat pile and bundle.

In the attainment of the bag liner of my invention, it is not possible to secure the results desired by cutting the paper narrower in the bottom portion of the liner. Not only would it be physically impossible to secure a flat contracted seam in this way, but even if this result were attainable the stretchability would be sacrificed along the bottom seam where stretchability is extremely desirable. It is possible, however, when sewing across the grain of the creping to contact the material to a supernatural extent. It is possible to contract the material as the stitches are being formed therein to an extent at least sufficient to counterbalance the stretching tendency of the sewing operation. One way of doing this, contemplates the employment of a sewing machine with a plurality of feeds, the first of which feeds the paper beneath the presser foot at a higher speed than the next feeding device. Where two feeds are employed, the actual stitch is usually made at the second feed, so that the line of stitching is made after the material has been gathered. This is not an advantageous operation, and is not preferred by me for the primary reason that in a gathered or contracted seam so formed, the line of stitching is not itself contracted after formation, and therefore tends to throttle any substantial attempt to stretch the seam itself. Thus any actual and substantial stretching of the seam may result in a bursting of the threads.

The procedure which I prefer to use contemplates the contraction of the seam after the formation thereof, whereby not only am I able to produce a liner narrower along the bottom seam than elsewhere, as shown in Figure 1, but I am also able to achieve a construction in which the threads joining the stitching are likewise contracted, so that the seam retains an expansibility fully as great as that which characterizes the prior art seam. I also have the additional advantage that I do not need to use a sewing machine differing from that in ordinary use.

In practicing my invention in its preferred form, I provide a contracting means which may be placed on the usual sewing machine. In Figure 2, I have shown a machine having a bed 6, and the feeding dog 7 which operates through a suitable orifice in the bed plate. The presser foot 8, held by the supporting rod 9, maintains the work in contact with the feeding dog, as the needle 10 works up and down through the work, all as is well understood in the art. Behind the presser foot I locate a plate 11 of flat or slightly curved shape, which is pivoted or hinged at its forward end, as at 12, to a suitable overhead support, which may be a rod 13, and is preferably adjustably mounted to provide means for securing the correct height of the forward end of the plate 11. The rearward end of this plate is urged toward the machine bed by a compression spring 14 interposed between the plate and a suitable abutment 15, or by other equivalent resilient

means. The ends of the plate may be slightly turned up or rolled as at 16 to facilitate the passage of material therebeneath. Another way of mounting my contracting means, is by attaching the plate 11 to a horizontally extending shaft, journalling the shaft in a suitable support on the machine bed, or otherwise, and providing an arm at the end of the shaft to which a spring may be attached, for urging the rearward end of the plate toward the machine bed.

In making a preferred type of liner I may start with a sheet of creped paper 17 which is folded over on itself as at 17c to form layers 17a and 17b. Preferably the sheet will have near its lower margin a seam reinforcing strip 18 cemented thereto and conjointly creped therewith, such as is set forth in my co-pending application, Serial No. 320,289, filed November 19, 1928. The projecting edges 19 of the paper layers may be folded over on themselves to form a 4 or 6-layer seam portion 20, depending upon whether or not the reinforcing strips 18 have been used. Occasionally a 2-layer seam is employed. This portion 20 is the part which receives the stitches, and is indicated as being sewn beneath the presser foot 8 in Figure 2.

The forward end of the plate 11 approaches the presser foot quite closely, so that the material 20 being sewn is fed by the feeding dog 7 directly beneath it. The pressure of the spring 14, however, urging the rearward end of the plate 11 toward the bed, tends to resist the extrusion of the material beneath the said rearward end, and to clamp it between the plate and the bed. The material, during the sewing operation is being constantly fed forward, and consequently it begins to gather or crumple as shown at 21 in Figure 2. The gathering or crumpling action is, of course, materially assisted by the creping crinkles in the paper itself, running, as they do, transversely of the seam. The action tends in some measure to restore those crinkles which have been partially ironed out by the presser foot and feeding dog of the machine, or pulled out by tension in turning the seam. The material body 20 is also bodily corrugated as shown; and, since the forward end of the plate 11 is higher than the rearward end, these corrugations are compressed vertically as the material is forced into the tapering space between the plate 11 and the bed 6. The pressure will ultimately be great enough to compress the spring 14, and let some of the material out of the compression space. The sewing action is, of course, continuous.

It would be possible, of course, to provide positive means other than the usual feed of the sewing machine to cause the sewn material to enter my contracting device. Thus I might locate a pair of feeding rollers, longitudinally grooved if desired, behind the presser foot but ahead of the contracting device. This, however, I have not found necessary with ordinary materials.

The resultant seam, shown in Figure 4, is a body in which the crinkles of the paper have been partially restored, and which is itself corrugated as shown at 22. By reason of the manner of formation of these corrugations the material and seam will, however, be substantially flat as shown and will not have the ruffled form characteristic of the elongated prior art seam. The bag liner will have the form of the article shown in Figure 1, and will not only be readily insertable in a bag, and because of its greater stretchability present more resistance to breakage, but will be more

easily packed and stored, and will form a neater bundle for shipment.

and corrugated to shorten said seam to a length less than the width of said liner when in flat condition.

It will be seen that my process may be practiced upon the ordinary sewing machine with no more additional apparatus than comprises the plate 11, the mounting means 13 or its equivalent, and resilient means for pressing the rearward part of the plate toward the machine bed. The plate dimensions may be varied as required. Ordinarily the plate need not be substantially wider than the seam, and it may be narrower.

3. A lining structure of creped paper having a stitched seam characterized by a gathering both of the paper layers and of the stitching into a plurality of foreshortening corrugations disposed substantially in the same plane. 80

4. A lining structure of creped paper having a stitched bottom seam characterized by a gathering both of the paper layers and of the stitching into a plurality of foreshortening corrugations disposed substantially in the same plane, said seam being not greater in length than the width of said liner when in flat condition. 85

5. A structure of stretchable paper having a seam joining body portions of said paper, which seam extends in a direction of stretchability of said paper, said paper and the seam forming elements in said seam being jointly contracted and corrugated to shorten said seam. 90 95

6. A structure of stretchable paper, having body portions juxtaposed and folded over upon themselves and held together by a seam forming element so as to form a seam, which seam extends in a direction of stretchability of said paper, said seam as such being initially elongated with respect to said body portions, and said seam, including all elements of the formation thereof, being conjointly contracted and corrugated to shorten said seam to a length not greater than the original length of said body portions. 100 105

7. A process for forming structures of stretchable paper which comprises joining body portions of said paper to form a seam, whereby a seam is formed, which seam extends in a direction of stretchability of said paper, and which is longer than the normal length of said body portions, and afterward foreshortening said seam by forming therein a series of relatively small and fairly uniform self-sustaining folds or corrugations. 110 115

8. A process of making structures of stretchable paper, which comprises juxtaposing body portions of said paper and folding the edges thereof over and joining said portions so as to form a seam which extends in a direction of stretchability of said stretchable paper, and whereby said seam as such becomes elongated with respect to said body portions, afterward foreshortening said seam to a length not greater than the length of said body portions by forming in said seam, including all of the elements thereof, a series of relatively small and fairly uniform self-sustaining folds or corrugations. 120 125 130

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