

April 5, 1932.

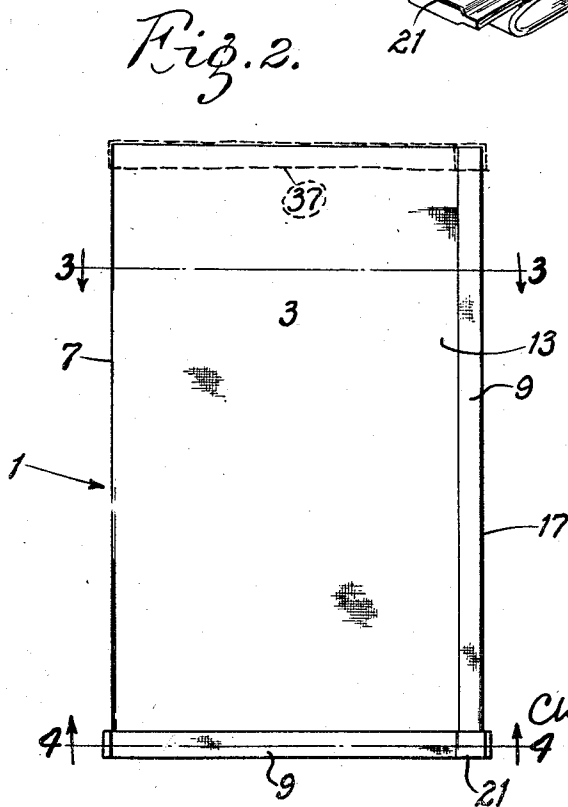
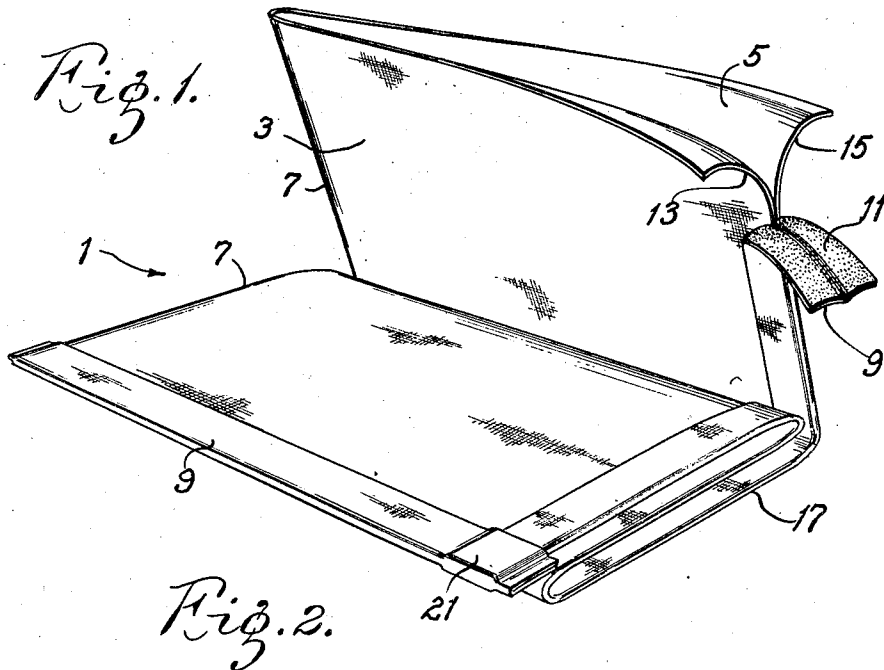
C. V. BRADY

1,853,013

FASTENING

Filed Feb. 8, 1930

2 Sheets-Sheet 1



Charles V. Brady
Inventor.
DeLo & Haynes
Attorneys.

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2 Sheets-Sheet 2

Fig. 3.

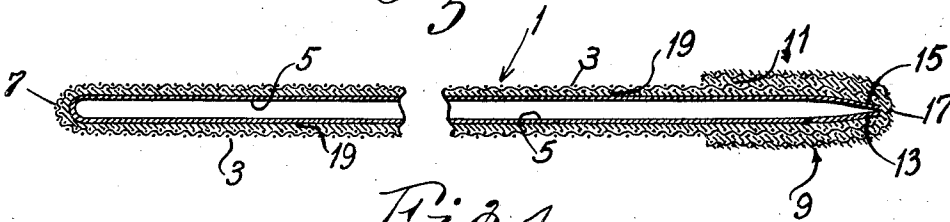


Fig. 4.

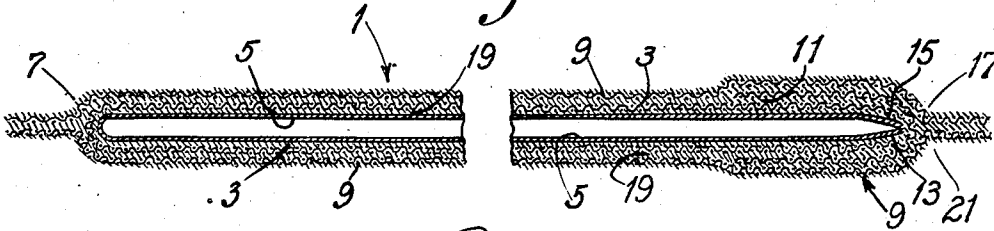


Fig. 5.

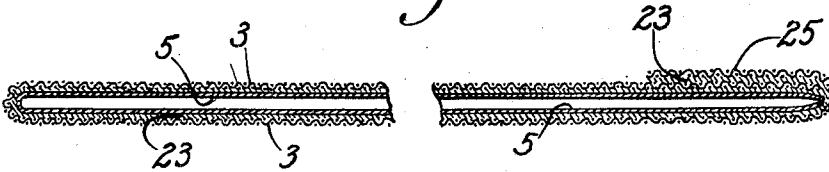


Fig. 6.

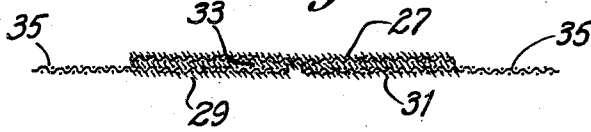
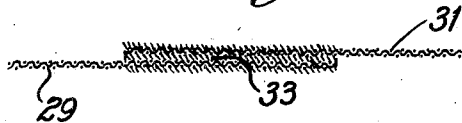


Fig. 7.



Charles V. Brady,
Inventor.
S. Haynes,
Attorney.

UNITED STATES PATENT OFFICE

CHARLES V. BRADY, OF ST. LOUIS, MISSOURI, ASSIGNOR TO BEMIS BRO. BAG COMPANY,
OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI

FASTENING

Application filed February 8, 1930. Serial No. 426,795.

This invention relates to fastenings for fabric, and with regard to certain more specific features, to seams for fastening woven fabric adapted to be used more particularly in connection with the manufacture of bags.

Among the several objects of the invention may be noted the provision of a seam for woven fabric bags and the like which is made without sewing in a binder strand, whereby a strong air-tight and liquid-tight fastening is afforded; the provision of a fastening seam of the class described which has a higher efficiency with less thickness and bulk than was had in prior sewed seams; and the provision of a fastening of the class described which may be quickly and economically manufactured, particularly in connection with bags, said bags requiring no subsequent turning after manufacture. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structure hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which is illustrated several of various possible embodiments of the invention,

Fig. 1 is a perspective view of a partially folded bag showing the application of the invention thereto, with parts laid open for purposes of description;

Fig. 2 is a plan view of the bag shown in Fig. 1, the dotted lines showing a means of final closure;

Fig. 3 is a diagrammatic cross section taken on line 3—3 of Fig. 2, the thickness of certain layers being exaggerated for clarity;

Fig. 4 is a diagrammatic cross section similar to Fig. 3, but taken on line 4—4 of Fig. 2;

Fig. 5 is a diagrammatic cross section corresponding to Fig. 3, but showing a modified form of the invention;

Fig. 6 is a cross section of a butt seam or fastening showing the general application of the invention; and,

Fig. 7 is a view similar to Fig. 6 showing

a modification comprising a lap seam or fastening.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

The conventional mode of fastening or seaming edges of woven fabric comprises overlaying two or more layers of fabric and sewing therethrough a strand of some nature such as a thread, cord, twine or the like. This method of fastening or seaming has certain disadvantages, which arise from several causes. For example, a bag seam should be quite strong, but, with a prior type of bag having a double or greater thickness at each seam, and stitching therethrough, the efficiency of the connection is only of the order of 60 to 70 per cent; that is, the seam per se has but 60 to 70 per cent of the strength of the goods in which the seam exists. The efficiency depends in part upon the number of layers of cloth included in the seam, but, because of the increase in bulk, the number of layers of cloth cannot be increased indefinitely. Even the conventional four-thickness seam is bulky.

The reason for the low efficiency above referred to is found in the fact that stresses applied to the sewed seam are concentrated at the points through which the thread passes. Thus the strain is greater in the regions around the threads and separation is likely to occur in such regions.

The described separation also leads to leakage or sifting through the openings of finely comminuted materials. Bags for holding such finely comminuted materials, powdered pigments for instance, have been lined with paper, an adhesive being used between the paper and the fabric in some constructions. When such a bag is sewed at its seam, the stitching goes through the paper, as well as through the fabric, and the local concentration of the stresses not only weakens the seam but stretches the openings through which the thread passes and causes sifting therethrough, thus preventing the procurement of optimum sealing effect from the liner. The openings further permit passage of moisture to and from the interior of the

bag. It will be understood that openings are present, not alone because of the stresses, but because the needle punctures themselves from openings without subsequent stretching.

6 The weakness of this prior sewed seam is also due to some extent to the fact that the threads beyond the sewed seam do not pull in the same line with the continuation of these threads running around the girth of the bag.
10 The threads beyond the seam stand out almost at right angles to the body of the bag and when stressed, these threads running around the girth of the bag tend to be broken off.

15 Another disadvantage of using thread or cord or the like for sewing or binding is that it necessarily passes through the fabric and/or paper liner from inside to outside and vice versa and functions as a capillary wick for moisture and the like which is transferred along the thread and into the bag, or vice versa. Furthermore, if the substance in the bag contains any free acid or other substance injurious to the threads, the threads
25 themselves may be attacked and weakened or destroyed.

It will thus be seen that the present invention provides a leak proof, lighter, stronger, more durable, and more flexible seam by eliminating both holding strands and the punctures inherent in the application of said strands.

The invention therefore provides a seam particularly adapted to bags which are to contain materials which readily absorb or give up moisture, oil and the like and/or those materials which are wholly or in part finely comminuted and/or those of substantial density requiring strong bags, although the above is not to be taken as a limitation of the use of the bags.

Referring now more particularly to Fig. 1, there is illustrated at numeral 1 a bag comprising, for example, an outer layer 3 of woven fabric such as burlap. For use with finely comminuted material, this outer layer 3 of woven fabric has fastened thereto an inner layer 5 comprising, for instance, papier mâché or other paper which will yield without cracking when the bag is folded or otherwise strained. The inner layer 5 is ordinarily held to the outer layer 3 by means of a waterproof binder such as an asphaltic material. It will be appreciated that when
55 the fabric 3 has been rendered leak proof by application of the liner 5, it is desirable to have the seam which cooperates therewith as tight as the remainder of the bag, or the leak proof effect will be lost.

60 The material 3, 5 (in one form of bag) is folded over at one edge 7, thereby leaving an opposite edge and a bottom edge to be seamed, an upper edge being left unfastened to form a mouth of the bag. The side walls
65 of the bag are between the edge 7 and strip 9.

The improved seam of this invention comprises a strip of material 9 to one side of which is applied, prior to application to the bag, a layer 11 of a cementing material or adhesive material, comprising preferably
70 processed rubber, gum, latex, asphalt or a like waterproof material. It is further desirable that this material be impervious to attack by that which is to be contained in the bags, for instance, acid proof.

75 After or before application of the cement 11 to the strip 9, but in either case before the cement dries, the strip 9 is folded upon itself. The cement is interiorly located and the strip is applied with its concave side over the juxtaposed edges 13 and 15 of the material comprising the remainder of the bag, thus forming a waterproof binder. Fig. 1 clearly shows the arrangement of parts at the laid open portions 9, 11, 13, 15. It is preferable
85 that after or at the time of applying the folded strip 9 to the juxtaposed bag edges (13, 15, for example) that the strip 9 be compressed and creased, either by rollers or otherwise, so that the cement 11 is forced
90 into the fibers of the woven fabric 3 and the seam made thin.

The strip 9 may be made of the same kind of woven fabric as comprises the outer layer 3 of the bag. It is ordinarily not necessary to use a paper liner such as the liner 5 on the strip 9, because the cement or adhesive functions as a seal for the binding strip 9. After the joint has dried, it is almost as strong as the original fabric. This is because the strip 9 is just as strong as the fabric 3 and thus the creased or turned over region 17 will not tear any easier than the unseamed region 7 at the other edge of the bag. Furthermore, the widths of the strip 9 may be made as great as is desirable to obtain a proper strength with the adhesive qualities available in the cement 11. If the area of cementing is increased, the strength is increased. It is conceivable that the joint may be made stronger than the remainder of the bag by using a stronger strip 9 and an ample width for providing a great adhesive area. The adhesion is particularly effective, because the cement surrounds and imbeds the upstanding fibers of the woven material 3 and passes into the interstices thereof. Thus, as is illustrated in Fig. 3, there is effected a substantially homogeneous material at the juncture between fabric and cement.

Referring to said Fig. 3, it will be seen to show the inner paper layer 5 held to the outer woven fabric 3 by means of an asphaltic or other binder 19. The edges 13 and 15 of the materials are joined by the strip 9 in the manner described. It is to be understood that the right hand edge of Fig. 3 shows the various layers of materials diagrammatically and that actually they are flattened out considerably by the compressing process through
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which the materials go in assembling the same (see Fig. 1).

In Fig. 4, taken in connection with Fig. 2, will be seen the manner of forming a corner of the bag. The strip 9 is first applied to the edges 13, 15 at the side of the bag, and thereafter the bottom is closed by applying a similar strip along the lower edges of the material 3. At the corner 21 the lower strip is applied over the side strip with the result shown in Figs. 1, 2 and 4. Fig. 4 also emphasizes the homogeneity of the joint effected. This figure, like Fig. 3, magnifies certain thicknesses of the material for the sake of clarity.

In Fig. 5 is illustrated a joint, which instead of being of the butt type with a cover piece such as shown in Figs. 1 to 4, comprises one in which a liner 5 is used in connection with a woven fabric exterior 3. It will be noted however, that the cement 23 which holds the layers 3 and 5 may be carried over on a flap 25 which, at the time of cutting the bag and applying the liner may be folded over as indicated at the right of said Fig. 5, so that the cement 23 is effective on the exterior of the sheet 3 to close the edge. Or, the flap 25 may be left without cement during the operation of cutting assembling and folding the sheets 3 and 5 and later have cement applied thereto and folded over and compressed as shown.

In Fig. 6 is illustrated the point that the joint need not be made at the edge of the bag or other device to which it is applied, but may be located upon a flat surface thereof. In Fig. 6 the cover piece 27 is flat and lays over the butt pieces 29 and 31, which latter are also flat. A cementing material 33 is applied to strips 27 and the whole applied to the butt edges 29 and 31. Fig. 6 also brings out the point that it is not necessary that the bag to which the present invention is applied be a lined bag. As indicated at numeral 35, the woven fabric is unlined in this case. The advantage of the invention under these conditions is that a stronger joint is obtained, although there is no advantage in having it leak proof when the woven fabric would leak at the region 35. However, the advantage of the increase in strength over the strength of a sewed piece or fastening is of such a degree as to effect a substantial improvement over prior art seams. It will be seen from Fig. 6 that any stresses which are engendered are evenly distributed over the surfaces which are juxtaposed between the elements 27, 29 and 31.

In Fig. 7 is shown a lap form of joint on the sides of a bag or the like. This is also a type of joint whose efficiency may be greater than 100 per cent, that is, the strength of the joint may be greater than the strength of the material which forms it (see also Fig. 5).

It will be seen from Figs. 3 to 7 that the

cementing or adhesive material not only embeds the fibers of the woven fabric but actually goes into the pores thereof and forms keys. Thus there is effected an advantage over any similar paper joint which might be used.

By means of the present invention, the seam strength can be increased for a given material beyond what it could be with prior methods. Previously, adding layers of cloth did not entirely eliminate the weaknesses because, the strains were nevertheless localized at the threads. If the number of threads were increased, then the number of openings for permitting leakage were also increased. The increased number of openings also tended to weaken the seam. Inasmuch as the seam is the weakest part of a sewed bag, a heavier material is necessary to produce a bag of given strength than is the case with the cemented seam bag. Also, the thickness of the material at the seam is less with the cemented seam bag. This makes it easier to close after filling, whether it is closed by cementing, sewing or tying.

The present invention also eliminates the necessity of turning the bag. Prior bags were sewed while turned inside-out and then turned so that the rough seam was positioned internally. The seam of the present invention is applied externally of the bag and the bag is never thereafter turned. There is no rough hem and the seam consequently presents an even appearance without turning. The elimination of the rough hem interiorly of the bag is also of advantage in preventing clinging of material when the bag is emptied.

It will also be appreciated that the elimination of the sewing itself is important in saving cost. The operation required for making the present fastening is one which does not require as high a degree of skill as the operation required for making the prior fastenings. Thus the present method has advantages over those in which a sewing operation is performed and the sewed joints either cemented or not cemented. A cemented, sewed joint of course has the further disadvantages, above indicated, that the threads act as capillary members between the outside and the inside of the bag. In this connection it may be noted that the oil from certain substances such as sweeping compounds is absorbed by the cotton sewing thread in sewed bags and transmitted to the outside of the bag, thus staining the cloth. The oil is not thus transferred by the binding strip of the cemented seam bag, wherein no thread is used. Furthermore, substances containing a certain amount of free acid attack the sewing thread in the sewed bag. The coated binding strip of the fully cemented seam bag is not so attacked.

Referring again to Fig. 1 it will be seen that after the seams are completed, that there

is formed a bag with an open upper mouth which should be closed after the bag is filled. It is to be understood that closure of this seam may be effected in the manner herein before described. This closure will be analogous to the closing seam at the bottom of the bag, so far as its cooperation with the side seams is concerned. As illustrated in Fig. 2, said seam or fastening to be made at the top of the bag is illustrated by the dotted line 37.

It is to be understood that the type of bag herein described is not the only one to which the invention is applicable. For instance, the bag may be folded up from the bottom and provided with side seams and an upper seam, or it may be otherwise formed.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A butt-joint seam comprising abutted areas of woven material, a woven cover strip covering the abutment therebetween and a cementing material between the strip and the abutting areas, said cementing material enveloping at least some fibers of the woven material and extending through at least some of the interstices of said woven material.

2. A filled bag comprising oppositely disposed and connected areas of woven material having juxtaposed edges at the top of the bag, and a woven binder strip longitudinally folded and attached by an adhesive to the top juxtaposed edges of the bag after the same has been filled.

3. A filled bag comprising oppositely disposed and connected areas of woven material having three pairs of juxtaposed edges, one pair on the bottom of the bag, one pair on the side, and the other pair on the top of the bag, folded woven binder strips covering pairs of juxtaposed edges on the bottom, the side and the top, and adhesive between the strips and said edges.

4. A filled bag comprising oppositely disposed and connected areas of woven material having three pairs of juxtaposed edges, one pair on the bottom of the bag, one pair on the side, and the other pair on the top of the bag, and seams formed at the bottom, side and top of the bag, each seam comprising adjacent areas of woven material, a woven cover strip covering the adjacent areas and a cementing material between the strip and the said areas, said material enveloping at least some fibres of the material and extending

through at least some of the interstices thereof.

In testimony whereof, I have signed my name to this specification this 3rd day of February, 1930.

CHARLES V. BRADY.

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