Jan. 1, 1946. H. E. CLAYTON 2,391,946

METHOD FOR FORMING A CLOSURE FOR PAPER BAGS

Filed March 15, 1941 2 Sheets-Sheet 1

Fig. 1.

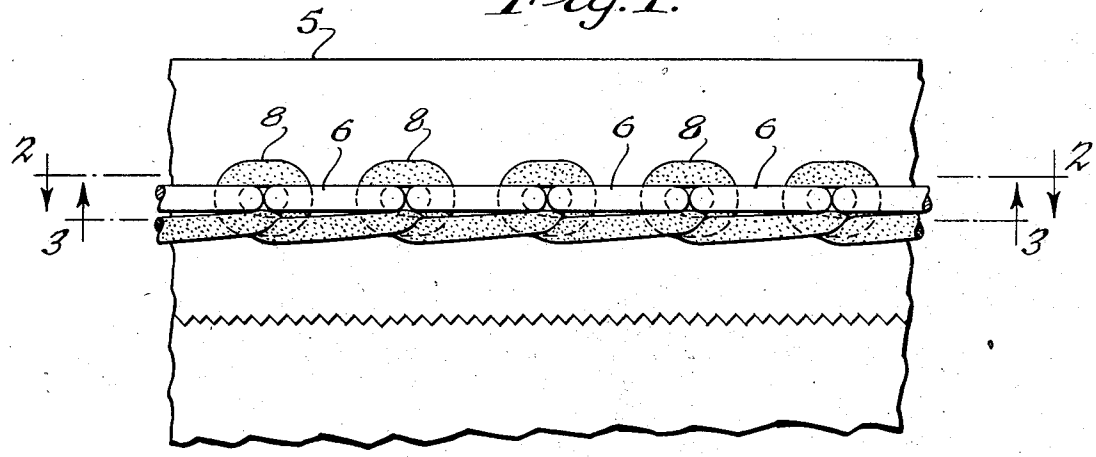


Fig. 2.

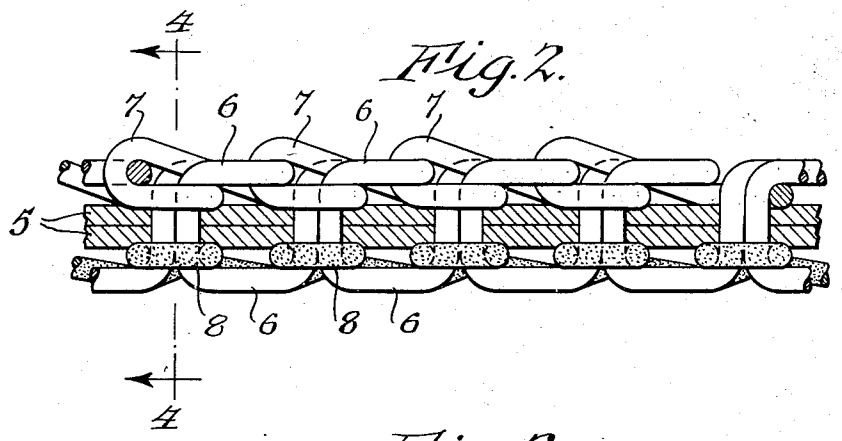
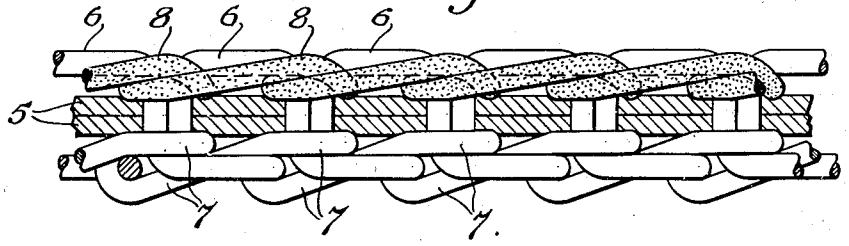


Fig. 3.



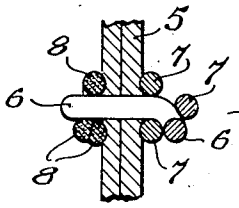


Fig. 4.

INVENTOR
Harry E. Clayton
BY
James A. Rock
ATTORNEY

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Filed March 15, 1941 2 Sheets-Sheet 2

Fig. 5.

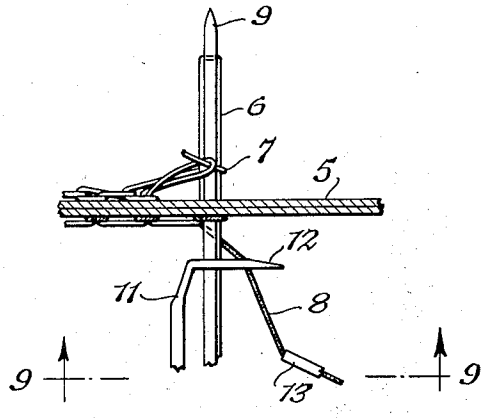


Fig. 6.

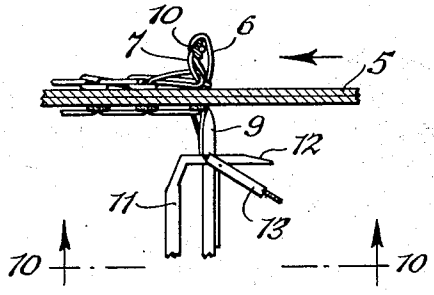


Fig. 9.

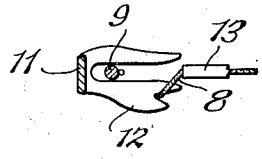


Fig. 10.

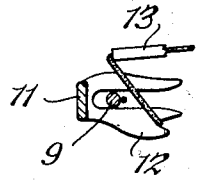


Fig. 7.

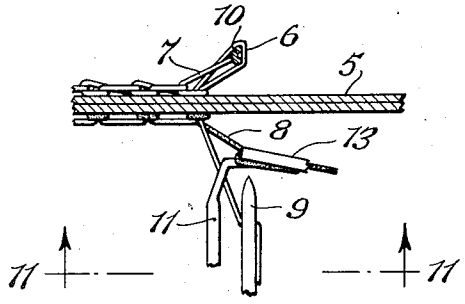


Fig. 8.

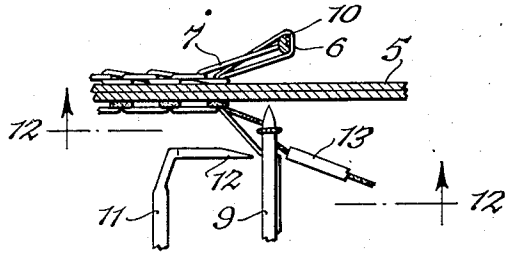


Fig. 11.

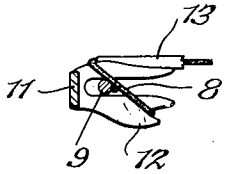


Fig. 13.

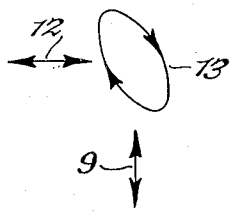
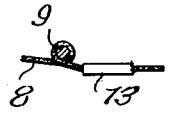


Fig. 12.



INVENTOR
Harry E. Clayton
BY
James D. Bock
ATTORNEY

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2,391,946

UNITED STATES PATENT OFFICE

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METHOD FOR FORMING A CLOSURE FOR PAPER BAGS

Harry E. Clayton, Holland, N. Y., assignor, by mesne assignments, to Bagpak, Inc., a corporation of Delaware

Application March 15, 1941, Serial No. 383,483

1 Claim. (Cl. 112—262)

This invention relates to new and useful improvements in stitch formations and the method of forming stitches and, particularly, seeks to provide a novel seam for use in connection with the closure formation of filled bags or the like.

Heretofore when filled paper bags or the like have been closed and sealed by the formation of a line of stitches across the formed closure, various forms of seams have been employed as well as various types of stitch formation. It has been known to employ a single thread chain stitch to secure the bag closure in its completely folded position wherein the collapsed bag mouth is folded back upon itself or to employ a double thread chain stitch for the same purpose. In the instances where the single thread chain stitch was employed, it has been observed that neither the thread entering the work on the needle side nor the interconnected loops on the work support side were so disposed or so proportioned that the apertures formed by the passage of the needle through the work were substantially sealed. Thus, the stitch closing of these forms of bag closures present difficulties in maintaining the bags in a siftproof condition. In those types of stitched bag closures which employed the double thread chain stitch, it has been observed that substantially the same condition held true but to a somewhat less degree since the second series of interconnected loops formed by the looper thread of the double thread chain stitch provided reasonably effective means for sealing those sides of the needle apertures which were presented towards the work support.

The above mentioned difficulties in connection with the formation of stitched bag closures through the employment of either single thread or double thread chain stitches have been overcome through the use of this invention by which both ends of each individual needle aperture formed in the work are substantially sealed by certain portions of the loops comprising the stitches.

It is, therefore, an object of this invention to provide a novel method for forming a closure for paper bags which comprises a seam of the double thread chain stitch type which employs an auxiliary or binding thread serially formed into a plurality of spaced loops located upon the needle side of the work and encompassing the base portion of each needle thread loop.

Another object of this invention is to provide a novel method for forming a seam adapted for particular use in connection with the securing of bag closures and which will maintain such closures in a substantially siftproof condition.

Another object of this invention is to provide a method for forming a seam of the character stated in which the loops of the auxiliary thread will substantially plug the needle apertures on the needle side of the work and in which the concatenated loops of the needle and looper threads will substantially plug the apertures of the work on the work support side.

With these and other objects in view, the nature of which will become more apparent, the invention will be more fully understood by reference to the drawings, the accompanying detailed description, and the appended claim.

In the drawings:

Fig. 1 is a fragmentary elevation of the closure portion of a bag including a stitch formation constructed in accordance with this invention and taken from the needle side of the work;

Fig. 2 is a horizontal section taken on line 2—2 of Fig. 1;

Fig. 3 is a horizontal section taken on line 3—3 of Fig. 1;

Fig. 4 is a vertical transverse section taken on line 4—4 of Fig. 2;

Figs. 5 to 8 inclusive are somewhat conventionalized figures illustrating a complete cycle in the formation of a stitch constructed in accordance with this invention;

Fig. 9 is a fragmentary detail vertical elevation taken along line 9—9 of Fig. 5;

Fig. 10 is a fragmentary detail vertical elevation taken along line 10—10 of Fig. 6;

Fig. 11 is a fragmentary detail vertical elevation taken along line 11—11 of Fig. 7;

Fig. 12 is a fragmentary detail vertical elevation taken along line 12—12 of Fig. 8; and

Fig. 13 is a motion diagram of the auxiliary looper elements.

Referring to the drawings in detail, the invention as illustrated is embodied in the closure seam of a filled paper bag or the like. As the invention resides particularly in the stitch formation included in the seam, the bag material 5 will be hereinafter referred to as the "work." The two or more layers of material which comprise the work 5 are secured together by a novel, modified two-thread chain stitch including a needle thread 6, a looper thread 7, and an auxiliary or binder thread 8. The needle and looper threads together define a plurality of serially formed concatenated loops on the work support side of the seam. The needle side of the seam presents the normal appearance of a series of through and through stitches and, in addition, is provided with the auxiliary or binder thread

8 which is formed into a plurality of spaced connected loops which encompass the base portions of the respective needle thread loops on the needle side of the work. Thus, this modified two-thread chain stitch presents a stitch formation which is particularly adapted for use in conjunction with the closures of filled paper bags or the like, since the concatenated loops of the needle and looper threads on one side of the seam will effectively seal the needle apertures and the loops of the auxiliary or binder thread will effectively seal the needle apertures on the other side of the seam to thereby provide a bag closure seam which is substantially siftproof in nature.

In Figs. 5 through 8 of the drawings, there is illustrated the manner by which this stitch may be formed. In Fig. 5 the needle 9 together with an auxiliary loop forming fork 11 and an auxiliary looper 13 are shown in their proper relative positions during the first stage of a stitch formation, the needle being at the beginning of its retractive stroke. In Fig. 6 the needle 9 has been retracted from engagement with the work and the main looper 10 has been projected through the loop of the needle thread 6. At this stage of the cycle of stitch formation, the auxiliary looper 13 has moved upwardly and forwardly to the left to engage the auxiliary or binder thread around the loop forming fork 11, one arm of which is provided with a bifurcated end 12 adapted to receive the thread 8. As shown in Fig. 7, the previously formed stitch has been partly tightened by feed of the work through the machine and the auxiliary looper 13 has completed that portion of its cycle of movement necessary to effect the formation of a loop in the thread 8 around the auxiliary looper fork 11. The needle 9 at this stage of the cycle of stitch formation is approaching the work preparatory to the formation of another stitch. In Fig. 8 the feed step of the work through the machine has been completed and the needle 9 has been propelled through the loop formed in the auxiliary or binder thread 8 and is ready to pierce the work for the formation of another stitch. Figs. 9, 10, 11 and 12 of the drawings are elevational views which respectively correspond to Figs. 5, 6, 7 and 8 and more clearly show the exact manner by which a loop is formed in the auxiliary or binder thread 8. It should be noted that the loop forming fork 11 is oscillated laterally in order to effect the disengagement thereof from the auxiliary thread 8 subsequent to the engagement of the needle 9 within the loop formed in the thread 8, and to position the loop forming fork in its proper location to be again engaged by the auxiliary thread 8 preparatory to the formation of the next succeeding stitch. It should be further noted that the auxiliary looper element 13 travels in a generally elliptical path, the plane of which is disposed angularly with respect to the path of travel of the needle 9 in order that the loops which are formed in the auxiliary thread 8 may be directly positioned within the path of travel of the needle 9 without the necessity of providing more than just a two-motion movement to the auxiliary looper.

Fig. 13 is a motion diagram illustrating the paths of travel of the loop forming fork 11 and the auxiliary looper 13.

It is readily apparent that the novel, modified double thread chain stitch, formed in accordance with this invention, provides several advantages, particularly in connection with the closing of filled paper bags, which have not heretofore been provided through the use of prior known stitch formations. It should be noted that the auxiliary or binder thread 8 rests flatly against the bag surface and therefore substantially and tightly encompasses the base portions of the needle thread loops, and thus substantially seal the needle apertures on the needle side of the work, and the concatenations of the needle and looper threads effectively seal the needle apertures on the work support side of the work and a substantially siftproof seam is thereby produced. Since the auxiliary thread 8 is formed into a series of spaced loops joined by connecting thread portions, the whole of which lies flat against the adjacent surface of the work, any pull or strain tending to compact the needle thread and looper thread portions of the stitches together will be resisted by the tensile strength of the auxiliary thread 8. Thus, the formed stitches cannot collapse or be drawn together without first breaking the auxiliary thread. Furthermore, the provision of the auxiliary thread in the manner illustrated tends to prevent rupturing of the stitch formation as a result of tearing of the bag material between adjacent needle holes under imposed strains. In connection with the imposition of strains upon a seam constructed in accordance with this invention, as the strain on the seam becomes greater within the limits of strength of the stitch formation, there will be a correspondingly greater effective action of the auxiliary thread loops in plugging the needle apertures since there will be a tendency to draw the auxiliary loops on the needle side, as well as the concatenations on the work support side, through the apertures toward each other. Preferably, the auxiliary or binder thread 8, during the stitch forming operations, is drawn under the same degree of tension as the looper and needle threads in order that all slack may be fully taken up at the end of the formation of each stitch.

It is of course to be understood that certain details of arrangement and proportions of parts may be variously modified without exceeding the scope of the appended claim.

I claim:

In a method of forming a closure for paper bags comprising a seam of the double-thread chain-stitch type having a supplementary binder thread associated therewith, the steps of forming a loop in a binder thread, passing a threaded needle through said loop and then through the bag and then through a previously formed looper thread loop, retracting the needle to define a needle thread loop, inserting a threaded looper into said needle thread loop during the retractive movement of said needle, further retracting the needle to disengage it from said bag and from said binder thread loop, feeding the bag to tighten the previously formed stitch, and repeating the steps in the order named.

HARRY E. CLAYTON.