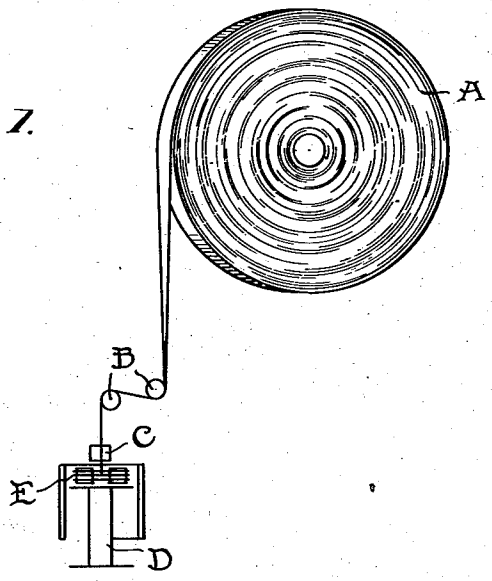
Oct. 19, 1943. J. S. SIMPSON 2,332,020

SEWING THREAD

Filed Feb. 24, 1942

Fig. 1.



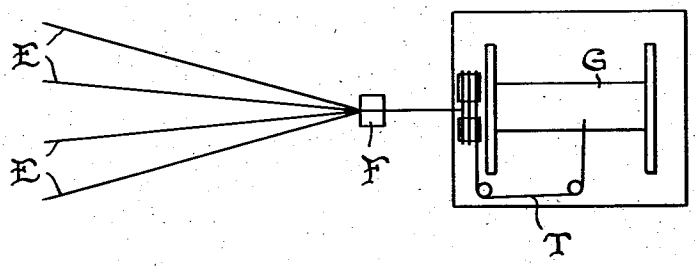


Fig. 2.

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SEWING THREAD

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Application February 24, 1942, Serial No. 432,167

6 Claims. (Cl. 57—155)

This invention relates to an improved sewing thread especially adapted for sewing paper bags.

There are various uses of paper bags which make it highly desirable that the entire bag, including its closure means, be readily dispersible in water and paper pulp solutions. For instance, bags of sugar closed at the ends by lines of stitches present difficulties under certain circumstances if the thread is of cotton fiber. That is, particles of the cotton often become detached when the bag is being emptied and fall into the mixture in which the sugar is being used. This necessitates additional straining operations to remove such particles, because the cotton particles will not be dispersed. Again, if the contents of the bag with a cotton thread closure are used in paper manufacture, care must be exercised to prevent the cotton getting into the paper pulp stock. A still further disadvantage of the cotton thread closure is the reclaim value of the paper bag for subsequent paper manufacture. Paper bags sewn with cotton thread have a comparatively small reclaim value, this figure running from eight to fifteen dollars a ton, due to the necessity of using manual labor in removing the cotton sewing thread, before the bag can be re-used in preparing pulp stock. For this reason, resort has been had to closing paper bags by pasting, but such a closure is too insecure for a large number of uses which require the safety and extra strength of sewing.

The primary object of the present invention, therefore, is to provide a sewing thread particularly adapted for closing paper bags which can be disposed together with the bag, as when reclaiming the bag in the paper-making industry.

Another object is to provide a sewing thread capable of being readily dispersed in water, but which will possess sufficient flexibility and tensile strength to permit its use in commercial machines now used for sewing paper bags with cotton thread.

Still another object is to provide a novel method of sewing paper bags with a thread such as contemplated by the present invention.

More specifically, the invention comprises a sewing thread made of paper pulp consisting essentially of a manila or hemp fiber stock adulterated, if desired, by a small percentage of wood fiber stock, said thread preferably being made of a plurality of plied ends, whereby the comparatively low tensile strength of the individual ends is compensated for by the plying of the ends.

In the accompanying drawing,

Figure 1 is a diagrammatical illustration of mechanism for twisting an end or thread; and

Fig. 2 similarly illustrates a plying apparatus.

In carrying out the preferred embodiment of the present invention, a pulp material is prepared and formed into paper according to the usual paper-making practices. This pulp may be prepared from manila or hemp fiber only, but a small percentage of wood fiber may be used as the tensile strength of the finished thread does not depend solely upon the inherent strength of the paper used in its production. The paper thus produced is slit into strips approximately one-quarter inch in width and these strips twisted or spun into what, for convenience, are termed ends. A plurality of these ends are then plied together to form the finished end. In the usual practice in the present-day practices of manufacturing paper from paper pulp stock, a suitable sizing material is included in the stock so that, when paper formed from the stock is calendered, the sizing will give a high surface finish to the paper. On the other hand, in carrying out the present invention, no sizing is used in the paper and calendering is minimized, all contrary to normal paper manufacturing methods, as it is necessary that the finished thread possess a rather high degree of flexibility in order that it can be used on the bag sewing machine and the individual stitches formed without rupture of said thread. While an all-manila fiber pulp stock will increase the strength of the individual ends, it has been determined that, by spinning or twisting the ends rather fine and plying a number of these ends together, the tensile strength of the thread is materially increased. Accordingly, it is thus possible to use as high as thirty or forty per cent wood fiber in the pulp stock, thus reducing costs, and still produce a paper thread that will stand up under the usages contemplated by the present invention.

In lieu of vegetable fiber paper ends, the invention, in its broadest aspect, can be practiced by forming said ends of certain water-dispersible synthetic plastics. For instance, the ends may be made of polyvinyl alcohol. As disclosed in an application filed concurrently herewith by Gilbert R. Beebe and Archie W. Koon, Serial No. 432,164, this material may be reduced to film form and the latter cut into strips which are spun or twisted to form the ends, all as is done with the paper pulp stock. The thread may, if desired, also be formed by extruding the material in thread-like or filamentary form. Plasticizers, of which glycerine is the most common, may be

used to impart flexibility to the plied thread made from these ends and the tensile strength may be increased by proper stretching of the thread or ends composing the same.

Reverting to that embodiment of the invention in which the ends are produced from a paper pulp stock, it is preferred that as large a percentage as possible of the fibers of the stock be arranged unidirectional or lengthwise of the web of paper into which the stock is felted. As previously stated, so far as concerns the tensile strength of the thread, spinning of the strips of paper into ends and the plying of said ends to form the thread is relied upon or substituted for the adhesion of hydrated fibers in the paper used in forming the thread.

It is also possible to increase the strength of the plied paper thread by treating it or the ends during or after spinning with cellulose ethers or esters or water-soluble synthetic resins, such as the polyvinyl alcohol previously referred to. Tests of plied paper threads so treated show a material increase in the strength of the thread, without an appreciable loss of flexibility.

A further ramification of the present invention lies in the application of the thread to the bag. The perfections in the sewing machines used for sewing paper bags have materially increased the speed of those machines and it has been found that by moistening the present thread slightly before it passes through the eye of the sewing needle, the liability of the thread breaking is greatly reduced. This is due to the fact that the moistening not only increases the flexibility of the all-paper thread, but it also lubricates the thread and minimizes frictional heat which is normally generated during the sewing operation.

As previously indicated, the present invention has various advantages. Primarily, it more than trebles the reclaim value of the sewn bag. Paper manufacturers will pay a minimum price of thirty to thirty-five dollars a ton for paper bags sewn with the present thread, compared with the minimum of approximately ten dollars paid for the paper bag sewn with cotton thread. The use of the water-dispersible thread permits the bag, as reclaimed by the paper manufacturer, to be placed in the pulp beater without any additional costs, as compared with the necessity of using manual labor to remove cotton thread from bags sewn with thread of that type. Again, numerous materials that are used in solutions in the manufacture of products, where the presence of the paper bag in dispersed form would not be detrimental but the presence of cotton fiber would be prohibited, can be shipped in bags using the present thread and used without emptying, it only being necessary to deposit the bag, ruptured or unruptured, in the container in which the solution is prepared. In any event, the use of the present thread absolutely precludes contamination of any product by cotton fibers.

The steps of twisting and plying the thread or ends composing the thread are shown diagrammatically in the accompanying drawing. Fig. 1 illustrates a roll A of the material in strip form and the strip is drawn over tensioning rods B, B, through a tube C on to a revolving flyer or bobbin D which twists the strip into an end E. Where a number of ends are used to form the thread, they are drawn through a tube F on to a revolving flyer or bobbin G which twists them together into the thread T.

What I claim is:

1. A sewing thread consisting of a plurality of plied, unsized, paper ends each composed essentially of a twisted paper pulp material consisting essentially of manila fiber pulp.

2. A sewing thread consisting of a plurality of unsized twisted paper ends composed of manila fiber pulp having wood fiber pulp mixed therewith, there being a preponderance of manila fiber pulp.

3. A paper bag closure formed by a sewing thread extending through the wall of said bag, said bag and thread both being dispersible in the beater of paper-making apparatus under normal paper-making procedure.

4. A paper bag closure formed by a sewing thread extending through the wall of the bag, said thread being composed of a mixture of manila fiber pulp stock and wood fiber pulp stock, and said thread, together with the bag being dispersible under normal conditions in the beater of paper-making apparatus.

5. A sewing thread consisting of a plurality of ends of twisted, unsized paper each possessing a comparatively low tensile strength, said ends being plied to impart to the thread sufficient strength to be fed through a machine-operated sewing needle, said ends being formed of a paper pulp stock comprising wood fiber and manila fiber.

6. A water-dispersible thread for closing paper bags, said thread being composed of a plurality of ends twisted together, each end being formed of a twisted strip of unsized, uncalendered paper pulp stock consisting essentially of manila fibers.

JAMES S. SIMPSON.