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METHOD OF MAKING BAG CLOSURE

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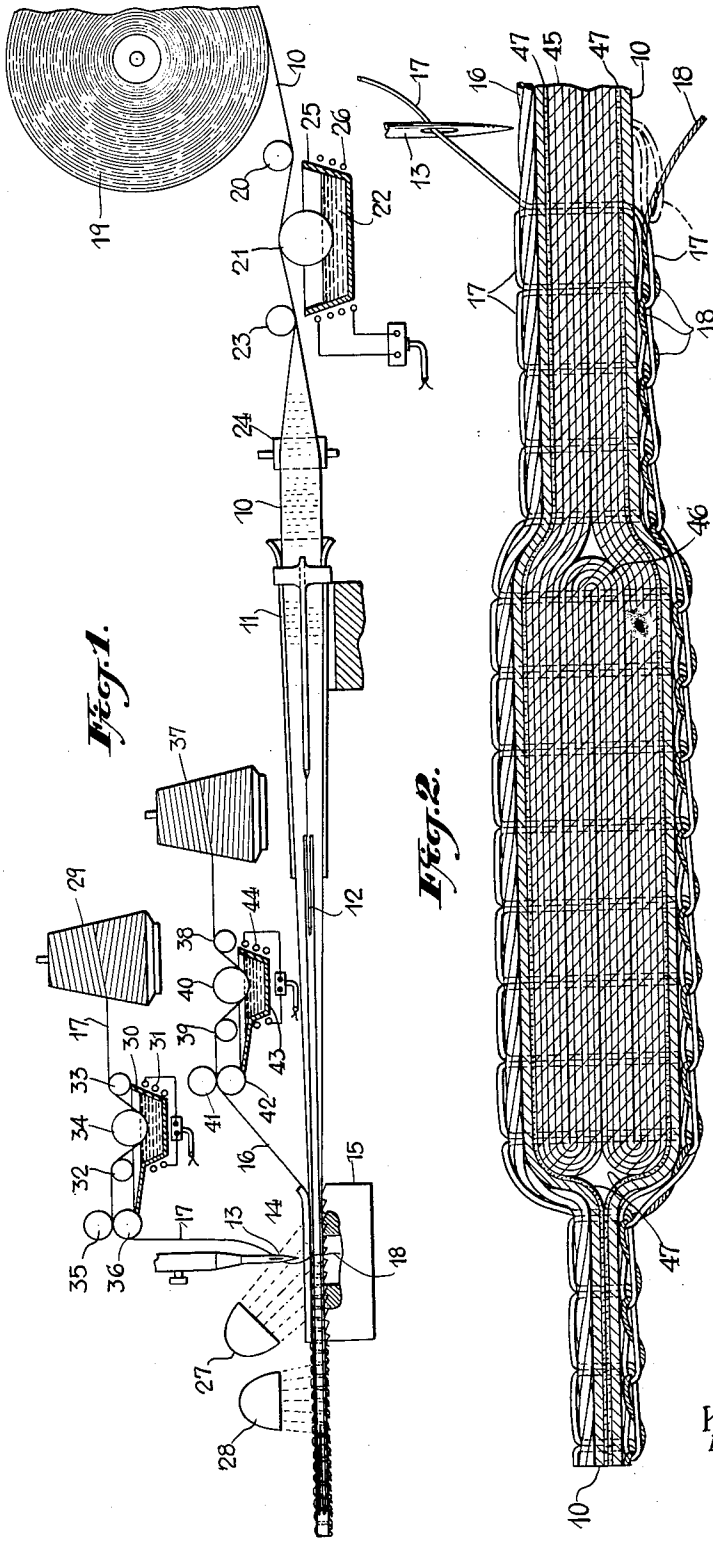


Fig. 1.

Fig. 2.

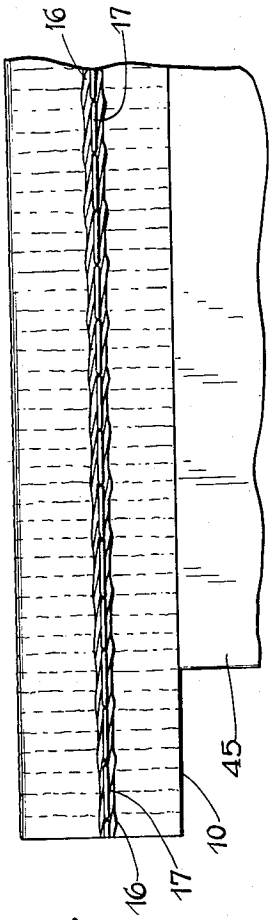


Fig. 3.

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METHOD OF MAKING BAG CLOSURE

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This invention relates to bag closures and to methods of manufacturing such closures and more particularly to closures for multi-walled paper bags used for holding very finely powdered material or for holding material which should be protected from moisture.

In the manufacture of heavy duty paper bags, it is customary to sever from a continuous tube or nest of tubes, bag length sections whose ends are closed by a tape folded about the ends and by stitching which passes through the tape and the ends of the sections. Usually the tape is made of paper which is pasted prior to folding about the end of a section. It is also customary to apply to one side of the tape a sealing member, usually of soft cord, and to sew through the sealing member, tape and end portions of the side walls of the bags.

The above-mentioned type of closure is satisfactory for many purposes but it will not entirely prevent the escape from the bag of finely powdered material and it is not moisture-proof, as the sealing member and the sewing thread or stitches will absorb moisture from the atmosphere which will travel along the stitches into the closure and thus come in contact with the contents of the bag. Certain prior solutions to these problems propose to overcome these objections by dipping the bag ends in wax. These solutions are not completely satisfactory because, in each case, an added step in the manufacture of the bag is required, namely, the step of dipping the bag ends and because the dipped ends of adjacent bags tend to stick together. In addition, the ends of the bags are not as attractive in appearance, the wax rubs off in handling of the bags and when the bags are dipped after the tape has been applied, paste is normally employed to hold the tape securely against the side walls of the bag, thus requiring the use of a material which does not assist in moisture-proofing the completed bag.

In accordance with my invention, I provide an improved bag closure which not only prevents the escape of very finely powdered material but also prevents the ingress of moisture through the closure. The closure of my invention is simpler and more economical than moistureproof closures of the prior art and results in a considerable saving of manufacturing time and expense.

In accordance with my invention, the tape which is applied to the ends of a bag is coated with a low melting point sealing substance, such as wax or mixtures of wax, and a resinous material, such as polyethylene, prior to the application of the tape to the ends of the bag. The low melting point sealing substance is applied to the tape in a melted state and it may be maintained in this melted state during the application and sewing of the tape to the ends of the bag so as to produce a seal between the tape and the side walls of the bag ends or the sealing substance may be melted during or after the sewing process. In the preferred embodiment of the invention, a sealing cord is applied to one side of the tape and the sewing threads pass through the sealing cord, as well as the tape, and the bag side walls. The sewing threads and the sealing

cord are treated with a moisture-repellent substance, such as wax, oil, or mixtures of wax and oil.

In an alternative form of the invention, the tape is coated on one side with wax and on the other side with polyethylene prior to folding of the tape about the ends of the bags. The wax is either maintained in a melted state from the time that it is applied to the tape until after the tape is folded about the bag ends or it is melted during or after the sewing process.

The invention accordingly comprises the novel bag closure, specific embodiments of which are described herein by way of example only and in accordance with the manner in which I now prefer to practice the invention.

The invention may be better understood by reference to the following detailed description of specific embodiments of the invention in connection with the accompanying drawing, in which:

Fig. 1 illustrates diagrammatically apparatus for making a bag closure in accordance with my invention; and

Figs. 2 and 3 are enlarged, cross-sectional and side elevation views, respectively, of the portion of the bag closure adjacent the sewing head shown in Fig. 1.

Referring to Fig. 1, a tape **10**, which may be either plain or creped kraft paper, is fed past a folder **11** which folds the tape about the end of a bag **12** which may be a multi-walled paper bag. The bag **12** and the tape **10** are fed together to a sewing machine of a well known type, comprising a needle **13**, a presser foot **14** and a looper and feeding mechanism **15**. In the preferred embodiment, a filter cord **16** is also fed to the sewing machine, and the cord **16** and the tape **10** are secured to the bag end portions or side walls by means of sewing thread **17** and looped thread **18**.

Prior to being sewn to the bag, the tape **10** is coated on the side facing the bag when the bag is closed by the tape with a low melting point sealing substance. By low melting point sealing substance is meant a material which becomes soft and will flow at a temperature low enough so that the bag being closed will not be damaged at the temperature required for melting or softening the material and which retains its moisture-resistance sealing properties after the bag is sealed. The following are examples of preferred low melting point sealing substances:

(1) Wax, preferably of the microcrystalline type, having the following properties:

Melting point, ASTM—140° F. to 170° F.
Penetration, ASTM—14 to 30
Viscosity, Saybolt at 210° F.—70 to 150
Oil content—4% maximum
Density—approximately 7 lbs. per gallon
Flash point—500° F. minimum

The abbreviation "ASTM" refers to the standards of the American Society for Testing Materials. Commercially available waxes having properties in the above ranges are supplied by the Bareco Oil Co. under the name "Victory Amber 155" and by the Quaker State Oil Co. under the name "Micro Cream."

(2) A mixture of polyethylene with the above-mentioned wax, the polyethylene being in the range of from one to ten per cent of the mixture by weight and preferably having the following properties:

Melting point—102° C. to 108° C.
Molecular weight—7000 to 12000

Other waxes and polyethylene having different properties may also be employed, but I have found that the above types give the most satisfactory results.

The low melting point sealing substance may be applied to a surface of the tape **10** in its melted state and then allowed to cool forming a solid layer of the substance on the tape. The tape may be applied to the ends of the bags

while the substance is in this solid state and during or after its application thereto, heat may be applied to cause the substance to soften or melt and to flow into the needle holes and between the tape and the side walls of the bag, thus forming a dust and moistureproof seal at the end of each bag. However, in the preferred form of the invention, as shown in Fig. 1, the sealing substance in a melted state is applied continuously to the tape as it is folded about the ends of the bags and fed to the sewing machine.

In Fig. 1, the paper tape **10** is fed from a roll **19**, under a guide roller **20**, over a roller **21** immersed in melted sealing substance **22**, under a guide roller **23** and past a twisting roller **24**. The sealing substance **22** is contained in a melting pot **25** which is heated by any well known means, such as an electric heating coil **26**. When the above-mentioned mixture of wax and polyethylene is employed as a sealing substance, the mixture preferably should be kept at a temperature of 100° C., and if wax alone is employed, the wax may be kept at a temperature in the range from 85° C. to 100° C.

When the sealing substance is applied to the tape **10**, as indicated in Fig. 1, it is normally still in a melted or softened state, as the tape is folded about and sewn to the end of a bag, but to make certain that it is still melted during the sewing process, the substance may be heated at the sewing machine, as by a heat lamp **27**. If desired, the substance may also be heated after the tape is sewn to the bag, as by a heat lamp **28**, but usually such after-heating is unnecessary.

To further aid in creating a moisture and dustproof seal at the ends of the bags while retaining the advantages of the seal described above, the tape **10** may be coated on its surface opposite to the one on which the aforementioned sealing substance is applied with polyethylene. The tape may be prepared, for example, by coating one surface of commercially available creped kraft paper having a stretch in the range from 5% to 10% and weighing 60 lbs. per ream with 20 to 25 lbs. per ream of polyethylene having a molecular weight of 19,000. This tape is then applied to the bag ends in the manner described above with the side coated with polyethylene, as just described, facing away from the bag.

In addition to providing a layer of a low melting point sealing substance under the tape **10**, the sewing thread **17**, and optionally the looper thread **18**, should preferably be treated with a moisture-repellent substance so as to assist in preventing moisture from entering the bags by way of the thread. The thread is preferably impregnated with wax of the type described above or with one of the following substances:

(1) No. 1 paraffin oil, such as that supplied by the Sinclair Refining Co. or the Socony-Vacuum Oil Co.

(2) A mixture of between 20% and 50% by weight of crude scale wax having a melting point of 120° F. dissolved in the No. 1 paraffin oil mentioned above.

When wax alone is used to impregnate the thread, the thread may be immersed in the melted wax until it is saturated and then it is removed, drained and cooled. The thread is then ready to use and may be fed directly to the needle **13** but alternatively and preferably, untreated thread may, as shown in Fig. 1, be fed from a cone **29** to the needle **13** through a pot **30** containing the melted wax and heated as by the electric heating element **31**. With this latter method, the thread is substantially continuously fed over a pair of guide rollers **32** and **33** under an immersion roller **34** and between a pair of squeezing rollers **35** and **36**. The rollers **35** and **36** squeeze or press out the excess wax which drains back into the pot **30**.

When the above-mentioned paraffin oil is employed to impregnate the thread, the thread may be immersed in the oil for 24 hours and then drained for about 48 hours, both steps taking place at temperatures between 60° F. and 100° F. The thread may then be fed directly to the needle **13**, but alternatively and preferably, the pot **30** may contain oil instead of wax, and untreated thread **17** may be fed through the pot **30** in the manner described above in connection with the second method for impregnation of the threaded by melted wax.

When the above-mentioned mixture of paraffin oil and wax is employed to impregnate the thread, the thread may be immersed in the mixture at a temperature between 140° F. and 160° F. until saturated and then removed and drained or squeezed to remove any excess of the mixture. In this case, also, the thread is ready for sewing without any further treatment, but preferably again untreated thread may be fed from the cone **29** to the pot **30** and thence to the needle **13** by way of the rollers 32–36, the pot **30** in this case being filled with the mixture of paraffin oil and wax maintained at a temperature between 140° F. and 160° F.

In the preferred form of the invention, a filter cord extending along the side of the tape **10** is also employed for its well known advantages. This filter cord, indicated by the numeral **16** in Fig. 1, is preferably also treated with a moisture-repellent substance of the type used to treat the sewing thread **17**. The filter cord **16** may be impregnated with wax, oil, or wax and oil, or with molten polyethylene, by immersion and the fed directly to the needle **13** in the manner first described in connection with each of the methods for treating the sewing thread **17**. However, untreated filter cord preferably is fed from a cone **37** over a pair of guide rollers **38** and **39**, under an immersion roller **40** and between a pair of squeezing rollers **41** and **42**. The immersion roller **40** immerses the cord in the moisture-repellent substance, such as wax, oil, or a mixture of wax and oil, or molten polyethylene, contained in the pot **43** which may be heated as by an electric heating element **44**.

It will be noted that when the thread **17** and the cord **16** are treated with a low melting point substance, such as wax, the substance will be heated and melted or softened by the lamp **27** and/or **28** during or after the sewing process, hence, the needle holes will be filled and the thread **17** and cord **16** will be sealed against moisture. However, the treatment of the thread **17** and cord **16** is such that there is no excess of the moisture-repellent substance so that the closure remains neat in appearance and there is little or no substance exposed thereby to cause stickiness.

Figs. 2 and 3 show in cross section and side elevation, respectively, a portion of a partially completed bag closure. In these figures, a multi-walled paper bag **45** whose side wall is folded inwardly at the portion **46** is enclosed at its end by the tape **10**. Between the tape **10** and the side walls of the bag **45** is a layer **47** of a low melting point sealing substance. The tape **10** is secured to the side walls of the bag **45** by means of sewing thread **17** and looper thread **18**, as well as by the layer of sealing substance **47**. The filter cord **16** extends along one side of the tape **10** and is secured to the side of the tape by the sewing thread **17**. It will be seen that the tape **10** extends a short distance beyond the end of the bag **45** and the folded portions are sealed and sewn together.

It will be obvious that although I have not shown a complete bag in Figs. 2 and 3, the remaining portion of the closure will have the same construction as that shown in Figs. 2 and 3. In addition, it will be obvious that the apparatus shown may be employed to manufacture bag closures for bags fed one after the other to the sewing machine rather than fed individually to the sewing machine, as shown in Fig. 1.

Having thus described my invention with particular reference to the preferred form thereof and having shown and described certain modifications, it will be obvious to those skilled in the art to which the invention pertains, after understanding my invention, that various changes and other modifications may be made therein

without departing from the spirit and scope of my invention, as defined by the claims appended hereto.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. The method of closing the end of a bag which comprises coating a tape with wax, folding said tape about the adjacent ends of said bag with the wax between said tape and said ends, applying a wax treated sealing cord to said tape at one side thereof, sewing said cord and said tape to the side walls of said bag with wax treated thread and causing said wax on said tape, said thread and said cord to assume a melted state when the tape encloses said ends.

2. The method of closing the end of a bag which comprises coating a tape with wax, folding said tape about the adjacent ends of said bag with the wax between tape and said ends, applying a wax treated sealing cord to said tape at one side thereof, sewing said cord and said tape to the side walls of said bag with oil treated thread and causing said wax on said tape and said cord to assume a melted state when the waxed surface of the tape is in contact with said ends.

3. The method of closing the end of a bag which comprises the steps of coating a tape with a low melting point sealing substance, folding said tape about the adjacent ends of said bag impregnated with a low melting point sealing substance, applying a sealing cord with the sealing substance between said tape and said ends to said tape at one side thereof and sewing said cord and said tape to the side walls of said bag with thread impregnated with a moisture repellent substance and the step of melting said sealing substance during one of said folding and sewing steps.

4. The method of closing the end of a bag which comprises the steps of coating a tape with wax, folding said tape about the adjacent ends of said bag with the wax between said tape and said ends, applying a wax treated sealing cord to said tape at one side thereof and sewing said cord and said tape to the side walls of said bag with wax treated thread and the step of melting said wax on said tape during one of said folding and sewing steps.

5. The method of closing the end of a bag which comprises coating a tape with melted wax, folding said tape about the adjacent ends of said bag with the wax between said tape and said ends, applying a wax treated sealing cord to said tape at one side thereof, sewing said cord and said tape to the side walls of said bag with wax treated thread and maintaining said wax in a melted state during the folding and sewing of said tape.

6. The method of closing the end of a bag which comprises coating a tape with melted wax, folding said tape about the adjacent ends of said bag with the wax between said tape and said ends, applying a wax treated sealing cord to said tape at one side thereof, sewing said cord and said tape to the side walls of said bag with oil treated thread and maintaining said wax on said tape and said cord in a melted state during the folding and sewing of said tape.

7. The method of closing the end of a bag which comprises the steps of coating a tape with a low melting point sealing substance, folding said tape about the adjacent ends of said bag with said substance between said tape and said ends, and sewing said tape to the side walls of said bag with thread impregnated with a low melting point sealing substance, and the step of melting said sealing substance during one of said folding and sewing steps.

8. The method of closing the end of a bag which comprises the steps of coating a tape with a low melting point sealing substance, folding said tape about the adjacent ends of said bag with said substance between said tape and said ends, and sewing said tape to the side walls of said bag with thread impregnated with wax, and the step of melting said sealing substance and said wax during one of said folding and sewing steps.

9. The method of closing the end of a bag member with a tape member folded about the end thereof which comprises the steps of coating one of said members with a low melting point sealing substance, folding said tape member about the adjacent ends of said bag member with said substance between said tape and said ends, and sewing said tape member to the side walls of said bag member with thread impregnated with a low melting point sealing substance, and the step of melting said sealing substance during one of said folding and sewing steps.

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