Stitching machines and closing systems for bags and pouches

1. General

The products processed in flour- and feed mills are often bagged in bags or pouches made of paper, cotton, jute, PP/PE, or mesh. These are package units of various sizes to hold a given weight of goods to be bagged.

After the filling the bags or pouches have to be closed. The closing procedure is done by stitching machines and closing systems. The most frequently used type is the portable bag closer. Also in use are the semi- to fully automated sewing lines. They are an integrated part of the bagging systems, where the filled units are automatically taken to the bag closer.

In addition, the system can be equipped with a label attachment facility which converts a portable bag closer from a plain sewing machine into a closing system to provide marking or necessary information about the goods at the upper edge of the bag.

The following essay describes the various types and applications of stitching machines and closing systems.

2. Types of Closing Systems

Basically, two different systems are in use:

a) Manual closing of bags and pouches

With this type of closing the stitching machine of choice is the portable bag closer. This system is indicated for the closing of small numbers of bags and pouches. These tried and tested machines must not lack in any establishment, particularly if there are short downtimes of a stationary system to be bridged, or to quickly seal a few bags on the side (see pict. 1, portable bag closer).
b) **Industrial closing of bags and pouches**

These closing systems facilitate a semi- to fully automated bagging procedure. Specially designed stitching machines, complete with automated bag in-feed and handling, etc. provide the industrial closing of bags and pouches in large numbers, and without the assignment of additional staff. This economical way of closing is indicated for the processing of large quantities. Units of this type are often applied at so-called 'bagging lines'.

![Double Thread Chain-stitch Machine](image)

**3. Portable bag closers**

The requirements on a bag-closing machine for bags and pouches are manifold. Particularly where the manual type is used, it has to be designed to meet 'rough' conditions. Therefore, the machines have to be strong in quality, durability, and safe in performance (see pict. 3, bag closer type Beta F with spring suspension).

One of the most important features of such machines is their smooth running, i.e. no interruptions during the closing procedure as well as simple and quick exchange of wearing parts and consumption components.

**3.1 Properties and application**

Portable bag closers usually function by simple thread chain-stitch. There are also types doing double thread chain-stitch, which require an appropriate device for the suspension of the bobbins (simple and double thread chain-stitch).

Such bag closers work at high speed. Their performing rate for closing one bag is of approx. 4 to 5 seconds, i.e. a seam length of approx. 12 m/min.

The components which are in contact with the sewing thread, require excellent wear and tear properties, since as the high speed generates a relatively strong abrasion. This applies particularly to the needles and all the parts that are necessary for the deviation of the thread. Most machines are also equipped with an integrated thread cutter.
3.2 Features

In order to allow an easy handling of the bag closer, it is equipped with a spring suspension. This feature can be adjusted to keep the bag close at hand, and within the desired working level (see pict. 3 and 4).

By way of an add-on system, the bag closer can be converted into a semi-automated device. Mounted to a special-design sewing column, it can be adjusted at various heights and used as stationary unit. A running blade as thread cutter, and a foot switch for operations complete the closing unit.

There are even portable bag closers for field use. A specially conceived drive allows connection to a 12 V or 24 V car battery, thus offering the possibility to work anywhere.
4. Bag closing system

Where large amounts of bags or pouches are concerned, bagging lines are often the answer, because they provide professional solutions. Such lines are designed as modular concept and include features such as:

- Automatic sewing head
- Column for sewing head
- Bag moulder
- Combined bag closing systems
- Automatic in-feed unit
- Label attachment facility, etc.

This is where double chain-stitch machines are applied. These units are equipped with a cutting device and optionally either with electro-mechanic or non-contact start-stop control. Depending on the in-feed of the bags or pouches, they are available right or left oriented. Also available: automatic bag in-feed.

A device guides the straightened upper edge of the bag towards the bag closer. At this point, the feeding speed is adjusted by way of a frequency converter.
In order to also control the sewing level (according to the size of the used bags or pouches), the needle is attached to a column, which can be adjusted in height manually or powered.

Additional features provide straddling and moulding of the bag or pouch top into the proper shape for closing by the bag closer.

Bag moulders are placed upstream of the bag closer.

Since filled bags often require one or more labels, a label attachment device is required. Automatic attachment systems provide feeding of the labels off a stack or a roll.
Example of a combined bag closing system: An automatic sewing head and a flow welding apparatus can be mounted on a pivoting column to allow the optional sewing or welding of paper or synthetic bags.

Given factors occurring at the bagging process require special solutions and adaptations, as the case arises.

Therefore, surveys observing the course of action and the quantities concerned have to be available. The product has to be manufactured according to customers’ request.

5. **Types of closure**

Portable bag closers are normally used for applying one-thread double chain-stitch seams.
In the majority of cases, bagging lines contain double chain-stitch sewing machines for a two-thread double chain-stitch closure of bags and pouches, with or without sealing thread, and also with masking tape.

Here we distinguish the following types of closure:

Types of closure (dotted line = form of seam)

1. 2-thread double chain-stitch closure with or without sealing thread
   - Bag material:
     - Paper - multi-layered
     - Paper - multi-layered with foil
     - PE-foil
     - PP-tissue
     - Jute
     - Net bags

2. 2-thread double chain-stitch closure with or without sealing thread and masking tape
   - Bag material:
     - Paper - multi-layered
     - Paper - multi-layered with foil
     - PE-foil

3. 4-thread double chain-stitch closure with or without sealing thread, double-line type
   - Bag material:
     - Paper - multi-layered
     - PE-foil
     - Paper - multi-layered with foil lining
     - PP-tissue
     - Jute

The choice of closure type is usually left to the customer. The various types require the respective execution of the bagging line and the sewing machines in order to apply the requested closing of the bags or pouches. The possibility to add a sealing thread, masking tape, or the combination with a label, must be provided.

The closing performance of a bag closing system covers 1200 bags/hour max. depending on the conditions of application and the type of bag or pouch. The speed of conveyance and feeding of the mentioned units is 6 to 18 m/min., and in most cases continuously adjustable. Additional adjustment ranges include the height and width of bags or pouches.

Obviously, the types of application can be quite varied and depend on the volume and the type of closure.

Whereas a portable bag closer finds its use in small and medium enterprises (or as makeshift to bridge downtimes of a bag closing system), a bagging line is appropriate for the processing of large flow quantities. Their execution, in turn, depends on the conditions of application. Such projects have to be adapted to meet the requirements of each user, as the case arises.

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