

The invention is in the field of methods of closing reclosable bags or sacks that have been secured against access and is concerned more especially with reclosable bags which have a first non-reclosable fastener and a second reclosable one.

We have seen various ideas of making bags secure against access, by providing them with reclosable fasteners; we have also seen bags with the facility of precluding access to their contents without leaving signs of that access behind. Many of these ideas concern the packaging of relatively small quantities of goods so that tear-off thread mats made of plastic or weak thread mat zones are sufficient to withstand the normal uses in dispatch, packaging and mailing.

However, these types of fasteners, protected against access, are unsuitable for heavy, bulky goods such as dog food, charcoal, cat litter and the like, which normally require a packaging which will bear more than 7 kg net weight. For this type of product, a typical bag only has a first non-reclosable fastener of some kind. A disadvantage of this kind of fasteners on bags with bulky goods is that the bags are not reclosable, so that if the bags are tipped up the goods can be spilled out through the open packaging. In addition to this, the contents can easily be infested by vermin or can dry out because the packaging is open. It is desirable that functional and cheap reclosable means be manufactured for such bags for bulky goods, for it may be necessary to remove some of the contents out of the bags several times often with large gaps between doing so.

The arrangement in the Ferrell patent, US-A-4,241,865, is an attempt to eliminate many of the disadvantages of these earlier inventions of non-reclosable packets or bags. This patent describes a method of closing a reclosable bag with a first non-reclosable, stitched fastener and a second closable zip-like fastener, which is outside the first fastener. Whilst the invention of the Ferrell patent proposes a re-closable bag that is secure against access and is for transporting heavy, bulky goods, it also has a disadvantage: it is generally complicated

to produce. The production of bags with a first non-reclosable fastener and a zip-fastener requires several reels of material which have to be stitched together in a continuous process. The zip-fastener requires stoppers at the ends. In addition to this, the stoppers for the zip-fastener have to be positioned correctly on the bag. In other words, the zip-fastener must fit the bag correctly.

FR-A-1.529.850 makes known a method of producing plastic sachets with profile fasteners which are created by separating and fusing together a plastic band with a profile fastener secured to it. However, the known method discloses steps which make it possible to produce the sachets open, manufacturing them with welding side edges, so that they can be filled up. This document does not specify anything about joining the profile fasteners with the material of the bag.

The object of the present application is principally to create a method with which a re-closable fastener can be applied in a simple and secure manner to bags which are already filled and which are continuously supplied to the closing machine.

In the production of the reclosable bags of the invention (according to claim 1) the facing profile elements are formed separately, hooked into each other and wound on a single reel. In a continuous process the second fastener is released from the reel and the lower mounting portions of the profile elements are stitched to the walls of a row of bags. The ends of the profile elements are heat-sealed between adjacent bags. Cord or thread is wound on a separate reel. The bag opening is chain-stitched with the cord to create the non-reclosable, detachable fastener, and the bag opening is consequently closed. The stitches are sewn so that they can be separated by hand. The closed bags are separated by the heat-sealed portion of the the second fastener being cut through.

The invention will be further explained by way of the examples. In which :

Figure 1 is a view in perspective of a reclosable bag, which is described by the invention.

Figure 2 is an enlarged partial view of a cross-section along the line 2-2 in Figure 1 looking in the direction of the arrow.

Figure 3 is a similar view to Figure 2, but the first non-reclosable fastener has been opened.

Figure 4 is a partial view in perspective with the first and second fastener open for access to the contents of the bag and taking out the same.

Figure 5 is a partial view in perspective which shows how a row of bags is provided with fasteners and are then separated from each other.

Figure 6 is a schematic representation showing the steps in the production of the reclosable bags of this invention.

Figure 7 is a partial view of a cross-section along the line 7-7 in Figure 6 looking in the direction of the arrow.

Figure 8 is an enlarged partial view of a cross-section, similar to Figure 2, and shows a second realization of this invention.

Figure 9 is a similar view to Figure 2 and is a further realization of the invention after an intermediate step in the production.

Figure 10 is a similar view to Figure 9; it shows the finished object of Figure 9 after completion of the production process.

To make the characteristics of the invention intelligible, reference is now made to the examples given in the drawings and they will be described in detail.

A reclosable bag (10) comprises a lower portion, which can be made of any suitable material and can be single or multi-layered, according to the material and the contents of the bag. In the preferred realization the bag (10) is shown with front and rear walls (11) and facing side walls (12), which are all made from double thickness paper. The bag walls (11) and (12) can also be made of plastics material such as polyethylene or polyvinylchloride. In the preferred embodiment the bag (10) also comprises a fixed bottom fastener (13) provided by a permanent chain-stitch or in the case of plastics material a heat-sealed or an adhesive seam.

The reclosable bag comprises an upper fastener (14), which is shown in more detail in the cross-sectional view in Figure 2. According to this invention, the upper fastener (14) comprises a non-reclosable, stitched fastener (15) and a second reclosable fastener (20), providing a bag, once it has been filled and sealed originally, which is a container that is secure against access, but once it has been opened, can be closed again by the consumer. If access is desired to the contents of the bag, the first non-reclosable, stitched fastener is opened, thus offering access to the bag opening, whilst the second reclosable fastener can be fastened again over the bag opening, after the first fastener has been removed.

The first non-reclosable fastener (15) comprises a line of chain-stitch made from thread, string or cord (16), which joins the bag walls (11) together tightly. The thread chain-stitch is designed in such a manner that the ends of the threads (16A) are loose. The chain-stitch can be torn apart or undone, by the loose ends of the threads (16A) being pulled by hand. To simplify removing the chain-stitch (16) of the first fastener, a tear strip or tear band (17) is attached, see dotted line in Figure 2. The tear band (17) is sewn into the bag walls (11) when the first non-reclosable fastener is created.

The second reclosable fastener comprises a pair of facing profile elements or strips (22) and (25). The first profile strip (22) comprises a number of ribs (23) protruding from the inner surface. Profile strips (25) comprise a number of ribs (26) protruding from the inner surface, which ribs (26) are aligned to interlock with the ribs (23) of the facing profile strip (22). The interlocking rib profiles (23) and (26) extend up to the top end or to the opening of the bag, so that the ribs (23) and (26) can interlock as shown in Figure 7. As a fixed rule of the invention, the profile strips (22) and (25) can interlock to fasten the upper portion of the bag when pressure is exerted by hand along the outer surfaces of the profile strips so that the ribs mesh. The interlocking ribs (23) and (26) can be undone when the edges (24) and (27) are grasped, which edges project beyond the interlocking ribs. If the edges (24) and (27) are separated or pulled apart, the interlocking ribs (23) and (26) come undone. The profile strips (22) and (25) are adhered at the mounting portions (30) and (31) of the strips (22) and (25) to the upper end of the bag walls (11). The chain-stitch thread of the first non-reclosable fastener (15) is stitched through the mounting portions (30) and (31) of the profile strip. The profile strips (22) and (25) are sealed together at the ends (33),

as shown in Figure 4. The strips are preferably heat-sealed at the ends, but acoustic welding, adhesive or similar sealing methods may also be used. The aim of the sealing process is to seal the ends of the profile strips so that an air-tight fastener is guaranteed when the bag is reclosed and to ensure that the interlocking ribs stay in the correct position. Heat-sealed profile strip ends (33) in the reclosable bag of this invention eliminate a disadvantage of the earlier invention with zip-fasteners, where the zip-fastener cannot close the bag opening completely. Moreover, the earlier invention with the zip-fastener is liable to be inadvertently opened, whilst the profile strips (22) and (25) of this invention guarantee an ultimate fastener that is highly resistant to accidental opening.

Figures 3 and 4 show the reclosable bag of this invention with the first non-reclosable fastener (15) removed. Once the chain stitch thread has been torn apart, to undo the chain-stitch, a number of small holes (18) become visible along the side walls (11) and through the profile strips (22) and (25), where the stitches were previously located. If the non-reclosable fastener (15) is removed, the upper end of the bag is open, allowing access to its contents. The upper end of the bag can be closed again through the two profile strips (22) and (25) and their corresponding interlocking ribs (23) and (26).

The method to produce the reclosable bag of this invention is shown in Figures 5 to 7. The reclosable bag can be manufactured in a continuous process where a number of such bags are equipped with the upper fastener (14). The row of bags (10) are filled in an earlier stage of the operation and the bag openings are left open.

In a separate stage of the operation the second reclosable fastener (20) with the profile strips (22) and (25) is formed in a usual extrusion process. The profile strips are interlocked and are wound onto a supply reel (35). The interlocked fastener (20) is released from the reel and arranged over the openings of the bags (10) as shown in Figures 6 and 7. The lower mounting portions (30) and (31) of the interlocking profile strips (22) and (25) are secured to the bag walls (11) through an adhesive applied to the inner surfaces of the strip. The adhesive can also be applied directly to the bag walls (11) instead of to the inner surfaces of the profile strips. The adhesive applied to the mounting portions (30) and (31) must connect plastics and the bag material sufficiently strongly whether the bag is made of

plastics material or paper. The bottom ends of the plastic profile strips (22) and (25) can be pressed against the bag walls with a pair of rollers (37) on either side. Other suitable means to guarantee a strong adhesion between the bag walls (11) and the reclosable, interlocked fastener (20) can be used.

When the reclosable fastener (14) is adhered to the walls (11) of the bag (10), the ends of the reclosable profiles are heat-sealed at the portions (33). In the continuous bag production of this invention, the heat-sealing process is carried out between adjacent bags (10).

The first non-reclosable fastener (15) can be applied before or after the heat-sealing process. In the preferred realization, the first fastener is applied before the heat-sealing process, because the cord (16) and the tear strip (17) are not made of plastics material and are consequently not susceptible to heat-sealing. If the tear strip (17) is made from plastics material, it must be applied after the heat-sealing process so that it can be undone again.

When applying the first stitched fastener (15), cord or string (41) are released from a roller or reel (not illustrated) and are sewn in a usual manner to form a chain-stitch which is tight enough to fasten the bag, but loose enough to be able to be undone again. During the application of the chain-stitch it is important to leave loose ends (16A) of the cord (18) so that it is possible to pull the chain-stitch apart when the bag has to be opened. If a tear strip is applied, this is released from a reel (42) before the chain-stitch is stitched. When the first non-reclosable fastener is applied, the individual bags (10) are cut apart, this being between the bags, along a cut line (36) which passes through the centre of the heat-sealed portion (33) of the reclosable profile fastener (14).

A second realization of the reclosable bag of this invention is shown in Figure 8. A reclosable bag (10) comprises outer walls (11) and (12) and a first non-reclosable fastener (50) with a chain-stitch thread or cord (51) with pull or tear strips (52). The second reclosable fastener (60) comprises a pair of profile strips (61) and (62) which are adhered to a second pair of strips. The strips (63) in this embodiment are made from the same material as the tear strips, such as, e.g. crepe paper. The profile strips (61) and (62), which are made of plastic, are adhered on their outer surfaces to the inner

surfaces of the strips (63) at the portion (64). The second pair of strips (63) are adhered on their inner surfaces at the portion (65) to the bag walls (11). An advantage of this embodiment is that the similar materials that make up the bag walls (11) and the strips (63) can be joined together easily and quickly in a continuous production process, contrary to the different materials that are joined together in the embodiment in Figure 7. The profile strips (61) and (62) can be applied to the strip (63) before the bag is produced and can be wound on a supply reel as is shown in Figure 6 with the roller (35).

Figures 9 and 10 show another embodiment of the method and the bag of this invention. The embodiment shown in Figures 9 and 10 is identical to the one shown in Figure 2 with the exception that the stitches are made on the bag before the reclosable plastic fastener is applied to the bag. Consequently, Figure 9 shows the stitched fastener (15") that is secured by the bag walls (11") without the profile strips (22") and (25"). In a subsequent operating step, see Figure 10, the plastic profile strips (22") and (25") are secured to the bag outer wall of the stitched fastener (15").



Claims

1. Method of closing the filler openings of bags (10; 10'), which are filled with a filling material, by utilising a reclosable fastener (20, 60) comprising interlocking profile strips (22, 25; 61, 62) and a non-reclosable, stitched fastener (15, 50), comprising the following method steps
 - the filled bags (10; 10') pass from a filling apparatus to a closing device adjacent one another,
 - the interlocked profile strips (22, 25; 61, 62), which have been rolled-up on a single supply reel (35) are released from the reel (35) and their mounting portions (30, 31) or strips (63), lying beneath the profiles (23, 26), are supplied to the bag walls (11; 11') along the openings and are connected thereto,
 - the non-reclosable, separable fastener (15, 50) is stitched along the bag openings,
 - the two profile strips (22, 25; 61, 62) are non-detachably interconnected, by means of a heat-sealing process, in the region of the bag ends and between the adjacent bags (10) at the portions (33), and
 - are subsequently separated along a cut line (36) through the heat-sealed portion (33) of the reclosable profile fastener (20; 60).
2. Method according to claim 1, characterised in that, prior to the profile strips (61, 62) being connected to the side walls (11') of the bags (10'), the profile strips (61, 62) are connected to strips (63'), which are intended to be adhered to the side walls (11') of the bag (10').
3. Method according to claim 2, characterised in that, prior to the profile strips being wound onto the supply reel (35), the strips (63) are connected to the profile strips (61, 62) and are unwound from the supply reel (35) together with the profile strips (61, 62) when being applied to the bags (10').



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4. Method according to claim 1, characterised in that the mounting portions (30, 31) or the strips (63) of the profile fastener (20, 60) are pressed towards the bag walls (11; 11') by a pair of rollers (37), and they are connected to said bag walls by an adhesive, which is applied to the inner surfaces of the mounting portions (30, 31) or to the side walls (11; 11') of the bags (10;10').

5. Method according to one of the claims 1 to 4, characterised in that, simultaneously with or subsequently to the profile fastener (10; 60) being connected to the bag (10;10'), a tear strip (17; 52) is mounted upon one of the mounting portions (30, 31) or upon a strip (63) and is connected to the profile fastener (20; 60) and the bag (10; 10') by a seam which is stitched with cord or string (41; 51).