

TITLE OF THE INVENTION: PACKAGING BAG**Technical Field**

[0001]

The present invention relates to a multifold packaging bag formed by stacking multiple films and, in particular, to a packaging bag colored with a colorant.

Background Art

[0002]

Packaging bags formed by forming, into a bag shape, a multifold film formed by stacking multiple films have been proposed as bags for packaging fluid, semifluid, powder, or the like. In such a packaging bag, the films forming the multifold film are unbonded over a wide range and can sideslip with respect to each other in the unbonded range. Thus, even if a pinhole occurs in one film, the other films can remain intact. Even if one film receives a bending stress, the other film can slide and escape. Therefore, such a packaging bag has advantageous effects, including improvements in mechanical properties such as pinhole resistance and impact resistance.

[0003]

For example, Patent Literature 1 discloses a packaging bag and a manufacturing method thereof. This packaging bag is formed by bending a multifold film into a tubular shape and then sealing the edges and has containing space for containing an object to be packaged.

Citation List**Patent Literature**

[0004]

Patent Literature 1: Japanese Unexamined Patent Application Publication No. 2004-43025

SUMMARY OF INVENTION**TECHNICAL PROBLEM**

[0005]

Such packaging bags may be colored using a colorant such as a pigment or dye for the enhancement of design properties, the discovery of a foreign object, or other purposes. However, the colorant may move to and stain the packaged object.

[0006]

As described above, the films forming the multifold film are unbonded over a wide range and thus the mechanical properties are improved. However, when the films forming the multifold film have high blocking properties, a pinhole penetrating through multiple films may occur, or the films may fail to slide and escape. This may result in problems such as the degradation of the mechanical properties.

[0007]

Accordingly, an object of the present invention is to provide a packaging bag that can prevent a colorant contained in a multifold film from staining a packaged object and in which the films forming the multifold film have low blocking properties and thus high mechanical

properties can be maintained.

Solution to Problem

[0008]

In order to achieve the above object, in a packaging bag formed by forming a multifold film into a bag shape, the multifold film being formed by stacking a plurality of multilayer films, a colorant is contained in a layer of the multilayer films, the layer containing the colorant being not in contact with an object to be packaged.

[0009]

In the packaging bag of the present invention, the colorant is contained in at least one layer except for the layer in contact with the containing space. Accordingly, the layer containing the colorant does not contact the packaged object, thereby preventing the colorant from moving to the packaged object.

[0010]

In the packaging bag of the present invention, the colorant is preferably contained in at least a layer of one of adjacent two multilayer films forming the multifold film, the layer being in contact with the other multilayer film.

[0011]

If the colorant is contained in at least a layer of one of adjacent two multilayer films of the multilayer films forming the multifold multilayer film in the packaging bag, the layer being in contact with the other multilayer film, the blocking properties of the one multilayer film and the other multilayer film can be reduced.

Effects of Invention

[0012]

According to the present invention, the layer containing the colorant does not contact the packaged object, thereby preventing the colorant from moving to the packaged object. Thus, it is possible to provide a packaging bag that can prevent a packaged object from being stained by a colorant. Further, if the colorant is contained in a layer of one of adjacent two multilayer films, the layer being in contact with the other multilayer film, it is possible to provide a packaging bag in which the multilayer films have low blocking properties and thus high mechanical properties such as high impact resistance and high pinhole resistance can be maintained.

Brief Description of the Drawings

[0013]

Figs. 1 include diagrams schematically showing the configuration of a packaging bag of an embodiment of the present invention, in which Fig. 1(A) is a perspective view of a multifold multilayer film forming the packaging bag; Fig. 1(B) is a detailed perspective view of the multifold multilayer film; Fig. 1(C) is a perspective view showing an aspect in which the multifold multilayer film is bent into a tubular shape; Fig. 1(D) is a perspective view showing a state in which a longitudinal seal is attached to the stacked edge of the multifold multilayer film bent into the tubular shape; and Fig. 1(E) is a perspective view of a packaging bag formed by

attaching transverse seals to the upper and lower edges of the multifold multilayer film.

Fig. 2 is an A-A sectional view of the multifold multilayer film of the embodiment.

Fig. 3 is a B-B sectional view of the packaging bag of the embodiment.

Fig. 4 is a diagram showing a method for manufacturing the packaging bag of the embodiment.

Description of Embodiments

[0014]

Now, an embodiment of a packaging bag and a manufacturing method thereof according to the present invention will be described in detail with reference to the drawings.

[0015]

In the present embodiment, a packaging bag 1 sealed using envelope seaming will be described as an example. First, the configuration of the packaging bag 1 will be outlined. Figs. 1 include drawings showing the configuration of the packaging bag 1 of the present embodiment.

[0016]

Fig. 1(A) is a perspective view of a multifold multilayer film 4, and Fig. 1(B) is a detailed perspective view of the multifold multilayer film 4. The multifold multilayer film 4 of the present embodiment is formed by flattening a tubular multilayer film formed using a known inflation method and acts as two multilayer films (inner multilayer film 2 and outer multilayer film 3) having edges 6 as the boundaries therebetween. More specifically, the multifold multilayer film 4 is formed by cutting off a predetermined-length region from a roll film 5 formed by flattening and winding up a tubular film. Thus, in the multifold multilayer film 4, the inner multilayer film 2 and outer multilayer film 3 are stacked and connected together at edges 6 serving as the boundaries therebetween. The method for forming a multifold film acting as two multilayer films is not limited to the inflation method, and any other known technologies, including a method of pseudo-bonding two films together by roll press, may be used as appropriate.

[0017]

Subsequently, as shown in Fig. 1(C), the multifold multilayer film 4 is bent into a tubular shape, and edge portions 7 and 8 thereof are stacked in such a manner that one edge portion, 7, covers the other, 8. Then, as shown in Figs. 1(D) and 1(E), a longitudinal seal 9 is formed in the region in which the edges 7 and 8 are stacked, along the edges 6 in the length direction so that the edges 7 and 8 are bonded together. Further, transverse seals 10 and 11 are formed at upper and lower edges perpendicular to the longitudinal seal 9, of the tubular multifold multilayer film 4 in such a manner that the transverse seals 10 and 11 cross the longitudinal seal 9. In this way, the multifold multilayer film 4 is formed into a packaging bag 1 having containing space. An object to be packaged is filled into the containing space in the manufacturing process. While the packaging bag 1 is formed using envelope seaming in the present embodiment, any other methods, including butt seaming, in which edge portions of the inner multilayer film 2 are sealed longitudinally, may be used as appropriate.

[0018]

In the packaging bag 1 thus configured, a colorant is contained in only at least one layer except for the layer in contact with the packaged object (containing space), that is, except for the outermost layer of the tubular multilayer film. Hereafter, the layer configuration of the packaging bag 1 will be described in detail. Fig. 2 is a sectional view taken along line A-A of the multifold multilayer film 4 shown in Fig. 1(B). The multifold multilayer film 4 consists of the inner multilayer film 2 and outer multilayer film 3, which are connected together and form a tubular shape. The multilayer films 2 and 3 have the connected edges as the boundaries therebetween and each consist of multiple layers. In the inner multilayer film 2, a first layer 2c, a second layer 2b, and a third layer 2a are stacked on the unbonded surface S1 thereof in this order. Similarly, in the outer multilayer film 3, a first layer 3c, a second layer 3b, and a third layer 3a are stacked on the unbonded surface S1 thereof in this order. The first layers 2c and 3c are formed of a resin having low blocking properties so that the multifold multilayer film 4 can act as two films. Preferred examples of such a resin include one containing an anti-blocking agent. The second layers 2b and 3b are formed of a base resin so that the multifold multilayer film 4 can exhibit good mechanical properties as a packaging bag. The third layers 2a and 3a are the outermost layer of the packaging bag and the layer to be contacted with the object to be packaged, respectively, and are formed of a resin which is suitably sealed. The first layers 2c and 3c and/or second layers 2b and 3b contain a colorant. Preferably, at least the first layers 2c and 3c contain a colorant. If the first layers 2c and 3c contain a colorant, it is possible to prevent the first layers 2c and 3c from blocking each other at the same time when the packaging bag is colored. Thus, the packaging bag 1 can maintain the good suitability as a multifold bag. Examples of the colorant include a pigment and a dye. As shown in Fig. 1(C), by bending the multifold multilayer film 4 into a tubular shape while positioning the inner multilayer film 2 in an inner position, the packaging bag 1 can be formed as a packaging bag which has high pinhole resistance and can avoid the colorant from moving to the packaged object.

[0019]

Fig. 3 is a B-B sectional view of the packaging bag 1 and is a partial sectional view showing a region including the transverse seal 10, of the packaging bag 1. Containing space S2 for containing an object to be packaged is formed between the side of the packaging bag 1 on which the longitudinal seal 9 is formed (hereafter referred to as "the front side") and the side opposite to the front side (hereafter referred to as "the back side").

[0020]

The front side consists of the inner multilayer film 2 (21) and outer multilayer film 3 (31), and the back side consists of the inner multilayer film 2 (22) and outer multilayer film 3 (32). In the regions other than the longitudinal seal 9 and transverse seals 10 and 11, the inner multilayer film 2 and outer multilayer film 3 are not bonded together and can move (sideslip or contact/separate) with respect to each other. Note that in Fig. 3, the unbonded surface S1 between the inner multilayer film 2 and outer multilayer film 3 is illustrative of the

unbonded state . The multilayer films 2 and 3 may be in contact with each other in some or all regions.

[0021]

In the inner multilayer film 2, the third layer 2a, the second layer 2b, and the first layer 2c are disposed in this order from the side thereof adjacent to the containing space S2. That is, the colorant is contained in the layer (first layer 2c) which is not the third layer 2a, which is in contact with the containing space S2. Since the colorant contained in the first layer 2c does not move to the packaged object contained in the containing space S2, it is possible to prevent the colorant from staining the packaged object.

[0022]

In the outer multilayer film 3, the first layer 3c, the second layer 3b, and the third layer 3a are disposed in this order from the side thereof adjacent to the inner multilayer film 2. That is, the first layer 3c adjacent to the inner multilayer film 2, of the outer multilayer film 3 and the first layer 2c adjacent to the outer multilayer film 3, of the inner multilayer film 2 contain the colorant. For the above reasons, the embodiment of the present invention can reduce the blocking properties of the outer multilayer film 3 and inner multilayer film 2. Thus, advantageous effects can be obtained, including the maintenance of the high mechanical strengths, such as the high impact resistance and high pinhole resistance, of the packaging bag 1. While known materials such as an organic synthetic dye (tar dye), natural dye, and inorganic pigment may be used as the colorant as appropriate, an inorganic pigment is preferred in terms of the blocking properties.

[0023]

As shown in Fig. 2, the multifold multilayer film 4 comprises two stacked multilayer film formed by flattening the tubular multilayer film whose innermost layers are the first layers 2c and 3c containing the colorant. Thus, the multifold multilayer film 4 can prevent the colorant from staining the packaged object, as well as can reduce the blocking properties.

[0024]

Next, a method for manufacturing the packaging bag 1 will be described using a case in which it is manufactured using a pillow packaging machine 100 as shown in Fig. 4. The following steps are sequentially performed: a first step in which a multifold multilayer film 4 is formed into a tubular shape; a second step in which a longitudinal seal 9 is formed; a third step in which a lower transverse seal 10 is formed; a fourth step in which an object to be packaged W is filled; a fifth step in which an upper transverse seal 11 is formed; and a sixth step in which the boundaries between connected bags are cut. The respective steps will be described below.

[0025]

The first step in which a multifold multilayer film is formed into a tubular shape: a multifold multilayer film 4 obtained from a roll film 5 travels around feed rolls 120 and 121 and is led to a former 112. A sensor 119 is disposed on the path from the roll film 5 to the former 112. The sensor 119 detects register marks printed on the multifold multilayer films 4 at predetermined intervals in the length direction so that the multifold multilayer films 4 each

having a predetermined length can be fed onto the path in the packaging machine 100 at predetermined time intervals. During the passage through the former 112, each multifold multilayer film 4 is bent into a tubular body in which the edges 7 and 8 of the bent multifold multilayer film overlap each other. More specifically, the multifold multilayer film 4 in which the first layers 2c and 3c, second layers 2b and 3b, and third layers 2a and 3a are stacked in this order from the inside, as shown in Fig. 2, is bent into a tubular body. Thus, the third layer 2a of the inner multilayer film 2 forms the inner surface of the tubular body. The tubular body has a multifold structure in which the outer multilayer film 3 is stacked on the outside of the inner multilayer film 2, and the first layer 2c containing the colorant, of the inner multilayer film 2 and the first layer 3c containing the colorant, of the outer multilayer film 3 are in contact with each other.

[0026]

The second step in which a longitudinal seal is formed: at the timing when a multifold multilayer film 4 moves at a predetermined time interval, a longitudinal sealer 113 heat-seals the overlapping edges 7 and 8 of the multifold multilayer film 4 by contacting the contact surfaces thereof with each other or separate them from each other, thereby forming a longitudinal seal 9.

[0027]

The third step in which a lower transverse seal is formed: after the longitudinal sealer 113 completes the heat-sealing, a squeezing roll 115 is closed to squeeze the tubular body formed from the multifold multilayer film 4. Then, transversely sealing machines 116 and 117 are closed to form a lower transverse seal 10 in a predetermined position of the flattened tubular body.

[0028]

The fourth step in which an object to be packaged is filled: a predetermined amount of an object W to be packaged is introduced into a hopper 111 and thus filled into the tubular body.

[0029]

The fifth step in which an upper transverse seal is formed: a predetermined length of a yet-to-be-separated packaging bag 1a, the tubular body and the multifold multilayer film 4 following the tubular body are fed by opening the squeezing roll 115 and transversely sealing machines 116 and 117 and then rotating the feed roll 114. Then, the transversely sealing machines 116 and 117 are closed to heat-seal a predetermined position, thereby forming an upper transverse seal 11, as well as forming a lower transverse seal 10 connected to the upper transverse seal 11, of a subsequent packaging bag located upstream of the path.

[0030]

The sixth step in which the boundary between connected bags are cut: a press/cutter 118 is closed to press the lower transverse seal 10 of the yet-to-be-separated packaging bag 1a and the upper transverse seal 11 connected to the transverse seal 10, then cuts the boundary between both the upper transverse seal 11 and the transverse seal 10, and drops a packaging

bag 1 onto a conveyor 130.

[0031]

In this way, the packaging bag 1 shown in Fig. 1(E) is manufactured. The packaging bag 1 can prevent the colorant from moving to and staining the packaged object W. The packaging bag 1 also has advantageous effects, including the reductions in the blocking properties of the inner multilayer film 2 and outer multilayer film 3 and the maintenance of the high mechanical strengths.

[0032]

While the embodiment of the present invention has been described, the invention is not limited thereto, as a matter of course. Various changes or modifications can be made thereto without departing from the spirit and scope of the invention.

[0033]

For example, the multifold multilayer film does not have to be tubular and may be formed by stacking multiple separate multilayer films.

[0034]

The multifold multilayer film may be a twofold multilayer film, in which two multilayer films are stacked, or may be any other multifold multilayer film, in which three or more multilayer films are stacked.

[0035]

The colorant may be contained in only one multilayer film of the multifold multilayer film, or may be contained in the multiple multilayer films thereof. The colorant may also be contained in only one layer of each multilayer film, or may be contained in two or more of the multiple films.

[0036]

Each multilayer film may consist of two layers or three or more layers. The colorant may be contained in an intermediate layer of a multilayer film. However, in terms of the blocking properties, the colorant is preferably contained in a layer of one of adjacent two multilayer films, the layer being in contact with the other multilayer film.

[0037]

The stacked part of the packaging bag may be formed using butt seaming. The number of seals or the positions of the seals is not particularly limited. For example, three-side sealing or four-side sealing may be used.

DESCRIPTION OF NUMERALS

[0038]

- 1 packaging bag
- 2 inner multilayer film
- 2a third layer
- 2b second layer
- 2c first layer containing colorant
- 3 outer multilayer film
- 3a third layer
- 3b second layer
- 3c first layer containing colorant
- 4 multifold multilayer film
- 41 front surface of multifold multilayer film
- 42 back surface of multifold multilayer film
- 5 multifold multilayer roll film
- 6 side edge of multifold multilayer film
- 7 overlapping one edge of multifold multilayer film
- 8 overlapping other edge of multifold multilayer film
- 9 longitudinal seal
- 10 lower transverse seal
- 11 upper transverse seal
- 12 tubular body
- 100 packaging machine
- 112 former

CLAIMS

1. A packaging bag formed by forming a multifold film into a bag shape, the multifold film being formed by stacking a plurality of multilayer films, wherein a colorant is contained in a layer of the multilayer films, the layer containing the colorant being not in contact with an object to be packaged.
2. The packaging bag of Claim 1, wherein the multifold film comprises two stacked multilayer films formed by flattening a tubular multilayer film.
3. The packaging bag of Claim 2, wherein the colorant is contained in only an innermost layer of the tubular multilayer film.
4. The packaging bag of any one of Claims 1 to 3, wherein the colorant is an inorganic pigment.