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SE**(71) Applicant: **VAN DAM MACHINE B.V.,
Lemelerbergweg 28A
NL-1101 AH Amsterdam Z.O.(NL)**(72) Inventor: **Tielrooy, Robert Willem
Lindenlaan 402
NL-1185 NM Amstelveen(NL)**(74) Representative: **Lips, Hendrik Jan George, Ir.
HAAGSCH OCTROOIBUREAU Breitnerlaan
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NL-2596 HG Den Haag(NL)**(54) **Method and device for removing objects from packages.**

(57) Method and device for removing objects (13) from a number of packages (5) comprising two foils (24) mutually connected by longitudinal and transverse seams (25, 26) by clamping a package through clamping means (4), clamping a transverse seam (26) below the package (5), tightening of the foils by the feeding means (2), sticking a pin (36) through the package above the object (13) contained therein, guiding a knife (39) along the pin for cutting the one foil web (24), discharging the foil webs by a pair of discharging rollers (9) and pressing an object (13) out of the opened package (5) by means of a second pair of rollers (12) mounted on a slide (11).

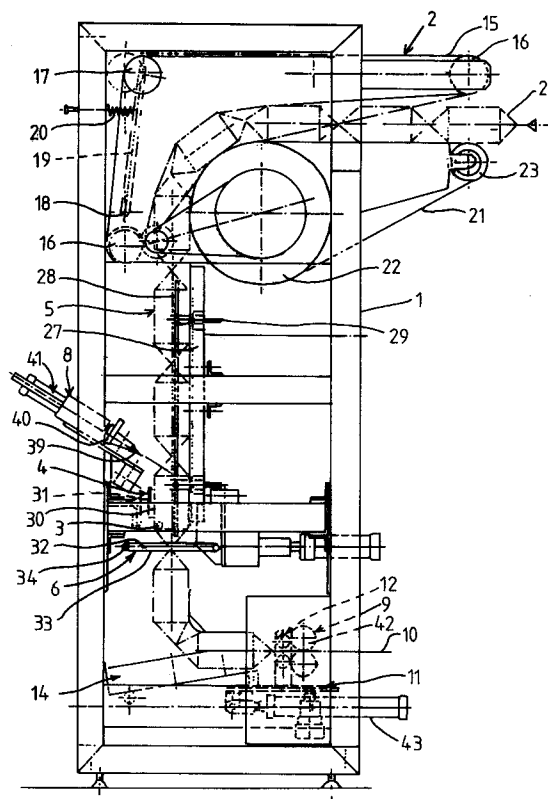


FIG. 1

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First, the invention relates to a method for removing objects from a number of packages, which packages comprise two plastic foils connected to each other along the two side edges and at mutual distances in transverse direction, in such a way, that one or more objects have been accommodated between each two cross seams, at which always one of the foils from one of the subsequent packages is cut through in transverse direction between feeding means for the packages and discharging means for the plastic foils free of objects.

Such a method is known from DE-A-2162765. In this method, the packages are received in recesses in a roller and the one foil has to be cut through immediately next to an object present in the package. On doing this, the foil to be cut through can not be supported, nor can it be tightened in order to guarantee a proper cut.

The invention now removes these drawbacks and to that end provides for, that after passing signalizing means, a package is clamped, the part of the foils being in downstream direction is clamped, the feeding means are moved back to a small degree, in such a way that the foils of the packages are tensioned, subsequently a piercing pin is stuck through said clamped package on a location outside of the object present in the package, after which the one foil is cut through by means of a knife cooperating with the pin, the clamping of object and foil is discontinued and the object is removed from the cut package during the pulling away of the foils and feeding a subsequent package to the clamping means.

By tightening the foils and the use of the piercing pin in the way described above, a proper cutting of the one foil can be guaranteed. It is also prevented that the knife contacts an object present in the package or that not just one foil, but both foils are cut through.

In particular it will be provided for, that the piercing pin is stuck into that part of the package, which is present between an object and the feeding means, since both of the foils are still intact there and thus both foils can be tensioned properly.

The invention also relates to a device for application of the method described above, which device comprises means for feeding packages, means for cutting the one foil of a package and a pair of rollers for discharging the foils after removing an object from a cut-open package, which device is characterized in that the feeding means consist of at least one conveyor belt guided over some rollers and a roller cooperating with it, or a second conveyor belt guided over this and one or more other rollers, which parts are arranged in such a way, that packages with different sizes can be transported thereby, that signalizing means are situated behind the feeding means, to detect pass-

ing of a package, that clamping means are mounted behind the signalizing means, for clamping an object in a package, that foil clamping means are mounted behind the clamping means for clamping the foils of a cut-open package, that a piercing pin is mounted near the location of the signalizing means, which is movable in the plane of the package and square to its direction of movement, which piercing pin has a slot that cooperates with a knife which is movable alongside the piercing pin for cutting one of the foils of a package.

By forming the feeding means in the way described, the device can be applied for packages containing objects of different sizes in a direction square to the plane of the foils. Therefore the device is more universally applicable, without parts having to be exchanged when switching to processing different packages.

In the device known from the aforesaid Patent Specification, one is restricted to the dimensions of the recesses in the feeding roller so that this roller must be replaced when packages containing objects of different dimensions should be processed.

In the device according to the invention, particularly the second conveyor belt of the feeding means can be guided by two rollers, of which at least the first one has a relatively large diameter while the first conveyor belt is guided over at least three rollers, two of which being situated at both sides of the point where the first conveyor belt is in contact with the second conveyor belt lying on the first roller, when the first conveyor belt follows a straight line between said two rollers, with the third roller being mounted on a pivotable arm, which by biasing means is biased to a position, in which the first conveyor belt is pressed against the second conveyor belt.

Therein, the force being exerted on the pivotable arm by the biasing means can be adjustable for adjusting the feeding means to various types of packages to be treated.

Advantageously, the device according to the invention can comprise control means for activating the clamping means for a package and the foil clamping means, after the signalizing means have given a signal thereto, for thereafter moving the feeding means in a direction opposite to the direction in which they move in feeding packages, for thereafter operating the piercing pin and the subsequent operation of the knife for cutting through the one foil of a package after which the control means cause pulling back of the knife and the piercing pin and for releasing both clamping means, activating the feeding means and the pair of rollers for discharging the foils of the opened package.

Herein, the clamping means for clamping a package can consist of a stationary guide and one or more movable strips, which can be pressed

towards the stationary guide in order to clamp an object between the stationary guide and the strip.

The foil clamping means can consist of two strips movable towards and away from each other, in such a way that clamping of the foils can take place almost below the middle of an object being present in the package.

Owing to this, both the foils of a package will be under an almost equal tension so that occurrence of irregular loads on one or more of the packages and on the objects present therein can be prevented.

For example, the objects can comprise a number of cups, or holders or lids therefor slid together, from plastic, which objects are not allowed to be exposed to excessive lateral loads in order to prevent undesired deformations thereof.

A simultaneous movement towards and away from each other by both strips of the foil clamping means can be achieved by connecting the ends of both strips to the parts of two teathed conveyor belts, moving in the opposite direction, which conveyor belts are situated in two parallel planes extending in the direction of movement of the packages and being square to their plane, each conveyor belt running over two teathed wheels and one wheel of each conveyor belt having been mounted on a common driven shaft, which extends in a plane parallel to the packages to be opened.

The means for supporting the knife in such a way that it can perform a movement back and forth, are preferably supported by a frame work, which is arranged in such a way, that it is movable towards and away from a package to be cut.

The supporting means can then be close to the piercing pin when the knife has to perform its cutting action. After cutting the foil with the help of the knife, the knife and its supporting means can be moved away in order to clear the way for letting through a subsequent package to be opened.

According to a further development of the invention, a second pair of rollers can be mounted immediately in front of the pair of rollers for discharging the foils, which second pair of rollers is situated on a slide, which is movable back and forth for positively removing an object from a cut-open package and bringing it onto a discharge conveyor.

Thus, the object is squeezed from the package by the second pair of rollers and it is no problem, that the side edges of the package are not cut open.

The invention is further explained by way of an embodiment, illustrated in the drawing, in which:

Fig. 1 diagrammatically shows a view of a device according to the invention; and

Fig. 2 diagrammatically shows a side view of a part of the device of fig. 1.

The device shown diagrammatically in the drawing comprises the frame 1 by which the various parts are supported. These are substantially the feeding means 2; the signaling means 3; the clamping means 4 for clamping a package 5; the foil clamping means 6; the piercing means 7; the cutting means 8; the pair of discharging rollers 9 for the empty foil web 10; the second pair of rollers 12 mounted on a slide 11 and serving to remove an object 13 from a cut-open package 5 and the discharging means 14 for discharging the objects 13.

The feeding means 2 comprise a first conveyor 15, which is guided over two stationary rollers 16 and a roller 17, which is mounted on an arm 19 pivotably supported in point 18, which arm is connected to one end of a draw spring 20, the other end of which being connected to the frame 1. One of the rollers 16 is driven in a way not further indicated. The feeding means 2 further consist of a second conveyor belt 21, which is guided over a roller 22 of relatively large diameter and over a small roller 23, which for example can be driven.

Through the spring 20 the conveyor belt 15 is pressed towards the roller 22 and thus towards the conveyor belt 21 in order to receive the mutually connected packages 5 between the conveyor belts. The force being exerted on the packages 5 and thus on the object 13, or objects present therein, is adjustable by controlling the force of the spring 20, for which means - not further indicated - are present.

In the known way, a package 5 consists of two plastic foils 24, which are connected with each other by two sealing seams 25 extending in longitudinal direction and sealing seams 26 extending in transverse direction, with one or more objects 13 between each two sealing seams 26.

After passing the feeding means 2, the packages move along a guide 27 with two side guides 28 almost square thereto, which are connected to the guide 27 by means of supports 29.

After that, the packages 5 arrive at the signaling means 3, which can for example be a photo cell not further indicated with accompanying light source, so that one can see when an object in a package is situated at a given position. To that end, one can for example make use of the fact, that the plastic foils themselves are transparent and the object contained in the package is not.

When it has been signaled that a package 5 is at a given position, the clamping means 4 are activated. These clamping means 4 can be in the shape of one or more strips 31, supported and guided by a plate 30, which strips can be moved back and forth by a pneumatic cylinder not further indicated. A package 5 is pressed against the guide 27 with the help of the strips 31, yet with a

relatively small force so that the object 13, or the objects, in the package 5 will not or almost not be deformed.

Further, the foil clamping means 6 are activated, which are situated below the package 5 concerned. These means are in the shape of two strips 32, each at their two ends being connected to the upper or lower portion of a toothed conveyor belt 33. Each belt 33 runs over two toothed wheels 34. The right hand wheels 34 in figure 1 are mounted on a common shaft 35 which can be driven in both directions, for moving the strips 32 towards and away from each other.

After a sealing seam 26 has been clamped between the two strips 32, the conveyor belts 15 and 21 are slightly rotated in the opposite direction by the rollers driving them, so that both the foils 24 are tensioned tightly around the objects 13.

Now the piercing pin 36, which is part of the piercing means 7, is pierced through the portions of the foils 24, which are situated over the object 13 in the clamped package 5. The pin is guided by supports and operated by a pneumatic cylinder, which parts are not further indicated. A bush not further indicated is also part of the supports and is situated at the right hand side of a package 5, as seen in fig. 2, for receiving the tip 37 of the piercing pin 36 at the end of its stroke.

Further, the slot 38 has been provided in the piercing pin 36, for receiving a knife 39, which is part of the cutting means 8. The knife 39 is situated on a slide 40 which is movable in longitudinal direction of the piercing pin 36 and has been mounted on the frame work 41, which can be brought to the piercing pin 36 for cutting the one foil 24, which is situated at the one side of the piercing pin 36. After that, the frame work 41 is moved away from the package 5 again, so that after pulling back the piercing pin 36 and releasing the clamping means 4 and 6, a subsequent package can be supplied with the help of the feeding means 2.

Simultaneously, the rollers 42 of the pair of discharging rollers 9 are activated for pulling the foils 24 towards these rollers. Then, the foils run between the rollers 12 mounted on the slide 11. As soon as an object 13 is in front of the rollers 12, the slide 11 is moved to the left, as seen in figure 1, such as by means of a pneumatic cylinder 43, so that the object 13 is pressed from the foil webs cut open at one side, in order to end up on the discharging means 14, which can be in the shape of e.g. a gutter or a conveyor belt or a combination thereof. Subsequently, the slide 11 is brought to its original position by means of the pneumatic cylinder 43 during supply of a subsequent package 5 to be opened to the device.

It will be obvious, that only one possible em-

bodiment of the device according to the invention has been illustrated in the drawing and described above and that many modifications can be made without falling beyond the inventive idea.

Claims

1. Method for removing objects (13) from a number of packages (5), which packages comprise two plastic foils (24) connected to each other along the two side edges (25) and at mutual distances in transverse direction, in such a way, that one or more objects have been accommodated between each two cross seams (26), at which always one of the foils from one of the subsequent packages (5) is cut through in transverse direction between feeding means (2) for the packages and discharging means (9) for the plastic foils (24) free of objects, **characterized in** that after passing signaling means (3), a package (5) is clamped, the part of the foils (24) being in downstream direction is clamped, the feeding means (2) are moved back to a small degree, in such a way that the foils (24) of the packages (5) are tensioned, subsequently a piercing pin (36) is stuck through said clamped package on a location outside of the object (13) present in the package, after which the one foil is cut through by means of a knife (39) cooperating with the pin (36), the clamping of object and foil is discontinued and the object is removed from the cut package during the pulling away of the foils and feeding a subsequent package to the clamping means (5, 6).
2. Method according to claim 1, **characterized in** that the piercing pin (36) is stuck into that part of the package (5), which is present between an object (13) and the feeding means (2).
3. Device for application of the method according to claim 1 or 2, which device comprises means (2) for feeding packages (5), means (36, 40) for cutting the one foil (24) of a package and a pair of rollers (9) for discharging the foils (24) after removing an object from a cut-open package (13), **characterized in** that the feeding means (2) consist of at least one conveyor belt (15) guided over some rollers (16, 17) and a roller (22) cooperating with it, or a second conveyor belt (21) guided over these and one or more other rollers (23), which parts are arranged in such a way, that packages (5) with different sizes can be transported thereby, that signaling means (3) are situated behind the feeding means (2), to detect passing of a pack-

age, that clamping means (4) are mounted behind the signalizing means (3), for clamping an object (13) in a package (5), that foil clamping means (6) are mounted behind the clamping means (4) for clamping the foils (24) of a cut-open package, that a piercing pin (36) is mounted near the location of the signalizing means (3), which is movable both in the plane of the package (5) and square to its direction of movement, which piercing pin (36) has a slot (38) that cooperates with a knife (39) which is movable alongside the piercing pin (36) for cutting one of the foils (24) of a package (5).

4. Device according to claim 3, **characterized in** that the second conveyor belt (21) of the feeding means (2) is guided by two rollers (22, 23), of which at least the first one (22) has a relatively large diameter while the first conveyor belt (15) is guided over at least three rollers, two (16) of which being situated at both sides of the point where the first conveyor belt (15) is in contact with the second conveyor belt (21) lying on the first roller (22), when the first conveyor belt (15) follows a straight line between said two rollers (16), with the third roller (17) being mounted on a pivotable arm (19), which by biasing means (20) is biased to a position in which the first conveyor belt (15) is pressed against the second conveyor belt (21).
5. Device according to claim 4, **characterized in** that the force being exerted on the pivotable arm (19) by the biasing means (20) is adjustable for adjusting the feeding means (2) to various types of packages (5) to be treated.
6. Device according to one of the claims 3 to 5, **characterized in** that it comprises control means for activating the clamping means (4) for a package and the foil clamping means (6), after the signalizing means (3) have given a signal thereto, for thereafter moving the feeding means (2) in a direction opposite to the direction in which they move in feeding packages (5), for thereafter operating the piercing pin (36) and the subsequent operation of the knife (39) for cutting through the one foil (24) of a package (5) after which the control means cause pulling back of the knife (39) and the piercing pin (36) and for releasing both clamping means (5, 6), activating the feeding means (2) and the pair of rollers (9) for discharging the foils (24) of the opened package (5).
7. Device according to one of the claims 3 to 6, **characterized in** that the clamping means (4)

for clamping a package (5) can consist of a stationary guide (27) and one or more movable strips (31), which can be pressed towards the stationary guide in order to clamp an object (5) between the stationary guide (27) and the strip (31).

8. Device according to one of the claims 3 to 7, **characterized in** that the foil clamping means (6) consist of two strips (32) movable towards and away from each other, in such a way that clamping of the foils (24) can take place almost below the middle of an object (13) being present in the package (5).
9. Device according to claim 8, **characterized in** that the ends of both strips (32) are connected to the parts of two toothed conveyor belts (33), moving in the opposite direction, which conveyor belts are situated in two parallel planes extending in the direction of movement of the packages (5) and being square to their plane, each conveyor belt (33) running over two toothed wheels (34) and one wheel (34) of each conveyor belt having been mounted on a common driven shaft (35), which extends in a plane parallel to the packages (5) to be opened.
10. Device according to one of the claims 3 to 9, **characterized in** that the means (40) for supporting the knife (39) in such a way that it can perform a movement back and forth, are supported by a frame work (41), which is arranged in such a way, that it is movable towards and away from a package (5) to be cut.
11. Device according to one of the claims 3 to 9, **characterized in** that a second pair of rollers (12) is mounted immediately in front of the pair of rollers (9) for discharging the foils (24), which second pair of rollers is situated on a slide (11), which is movable back and forth for positively removing an object (13) from a cut-open package (5) and bringing it onto a discharge conveyor (14).

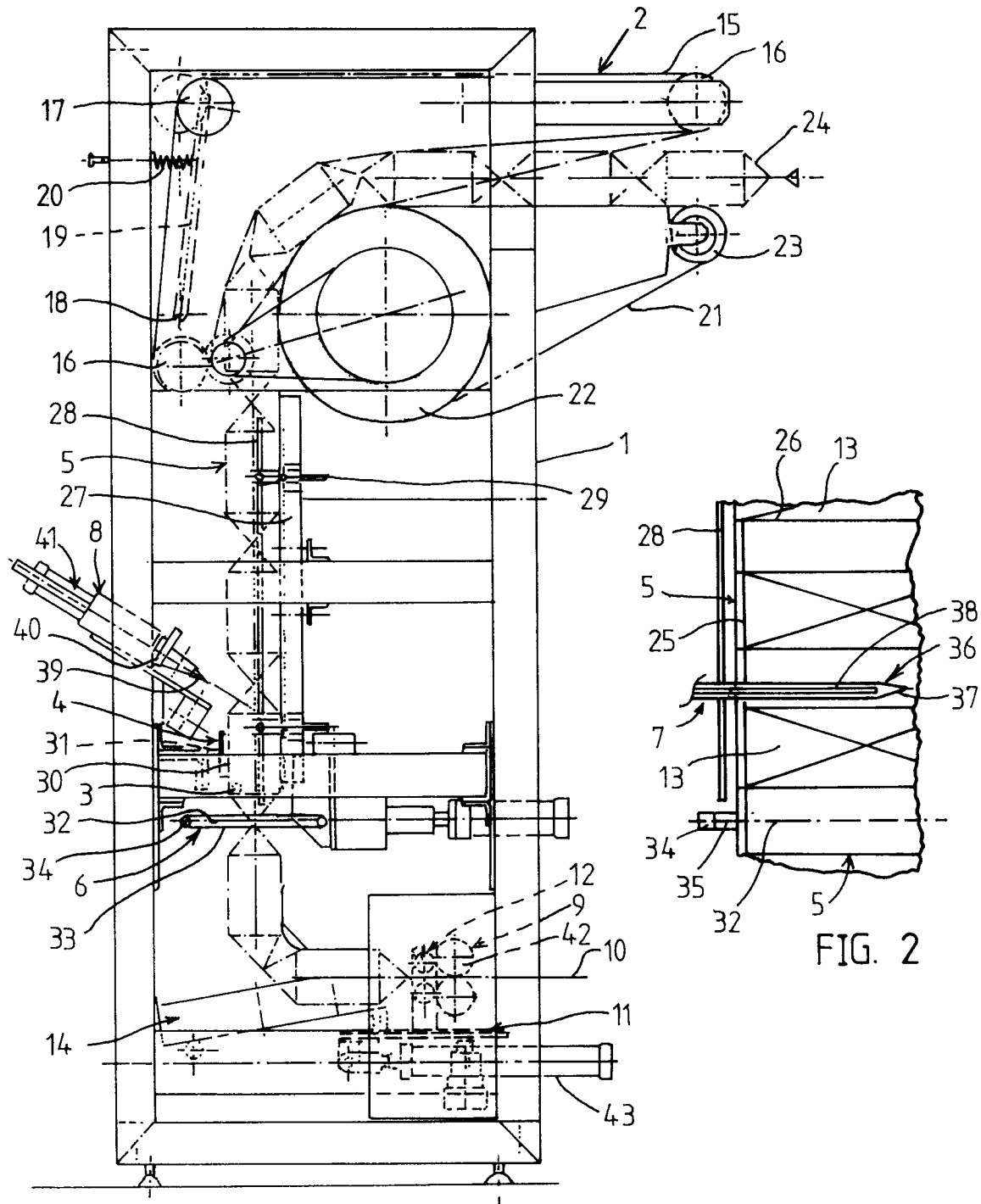


FIG. 1

FIG. 2



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EUROPEAN SEARCH REPORT

Application Number

EP 92 20 1488

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A,D	DE-A-2 162 765 (BELLAPLAST) * page 19, paragraph 4 - page 21, paragraph 2 * * figure 2 * ---	1,3	B65B69/00
A	GB-A-2 214 483 (KIRIN BEER) * page 7, line 21 - page 9, line 8; figures 1-3 * -----	1,3	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B65B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30 SEPTEMBER 1992	Examiner CLAEYS H.C.M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			