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(54) **DEVICE AND METHOD OF CUTTING FOR THE SEPARATION OF BAGS FOR FLEXIBLE PACKAGING OBTAINED FROM LAMINATED FILMS**

(57) Device for the transverse cutting of laminated films (1) at V-shaped die cuts (2) provided on this film at distances corresponding to the length of bags to be produced, wherein said device (10) comprises a pair of

blades (11, 12) spaced one from the other, such as to be arranged on either side of an apex (3) of said die cuts (2) during said transverse cutting.

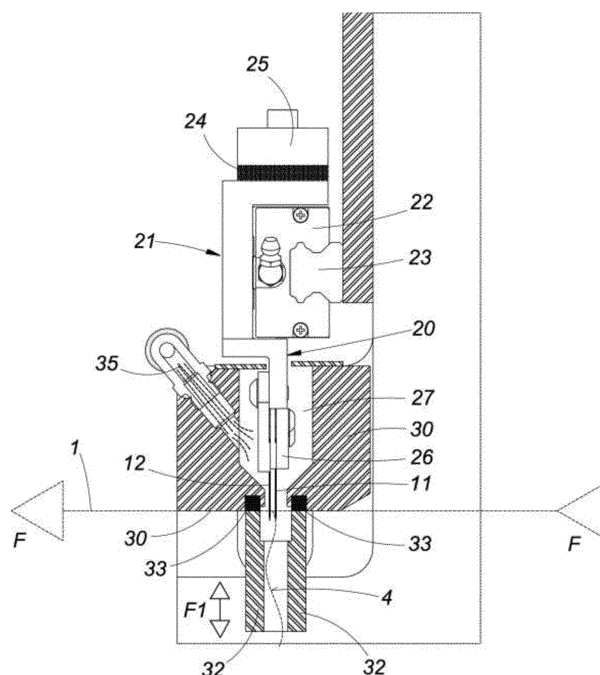


FIG. 6

Description

[0001] The object of the present invention is a device and a relative method of cutting for the separation of bags for flexible packaging obtained from laminated films, for containing foodstuffs for humans, animal feed, etc.

[0002] The laminated films used for the formation of these bags also comprise at least one layer of aluminium or in any case materials which have a certain rigidity.

[0003] These laminated films are adequately shaped by means of folding and longitudinal welding to form a tubular shape, formation of possible side gussets, welds and transverse cuts in order to separate the bags one from the other, that is to cut the tubular shape to the length of the bag to be formed.

[0004] So as to avoid that, once the bag is shaped and later filled with the product, the sharp edges of the same bag during storage and transport go to incise the nearby bags, perforating them, or worse go to injure the end user, during configuration of the bags the corners are rounded by means of a die cutter.

[0005] In practice, referring to the accompanying Figure 1, before the operation of transverse cutting of the tubular shape to a length corresponding to that of the bag which is intended to be obtained, on the tubular shape 1 cuts 2 are formed with V shape with rounded edges.

[0006] Due to minor inaccuracies during the forward movement of the film it is extremely difficult to match the transverse cut with the apex 3 of the V-shaped die cut 2 previously formed.

[0007] This entails that an edge of the bag, upper or lower, is not perfectly rounded but has a protuberance 3 (Figure 2) known as "nib" which is dangerous in that sharp and therefore not acceptable given what has been previously said.

[0008] In order to avoid this disadvantage the state of the art provides for a double cut with removal of approximately 2 mm of product, so as to avoid the formation of the nib 3, as shown in Figure 3.

[0009] This operation is normally performed by forming a first cut at the theoretical distance of a millimetre from the apex 3 of the V-shaped die cut 2. The film is made to move forwards by 2 mm from right to left with reference to Figures 1 to 3 and a second cut is performed, removing a portion of product 4 of 2 mm.

[0010] This double cutting operations entails for obvious reasons a deceleration of the production rate.

[0011] More specifically, it is pointed out that in the production of these bags the film is made to move forwards continuously for the performing of certain operations, such as longitudinal folding, and intermittently for the performing of other operations, such as in fact die cutting and transverse cutting.

[0012] It is clear therefore that the forward movement of the film between the two consecutive cuts is a down time in the production process, it not being possible in the second cutting operation to perform any other operation on the stopped film.

[0013] The object of the invention is that of eliminating the disadvantages of the prior art illustrated previously.

[0014] More particularly, an object of the present invention is that of providing a cutting device which avoids the formation of sharp corners or "nibs" in the production of bags for flexible packaging.

[0015] Another object of the invention is that of providing a cutting device which avoids down times in the process of production of bags.

[0016] Yet another object of the invention is that of providing such a cutting device which is simple and economical to produce, as well as highly reliable.

[0017] These and other objects are achieved by the cutting device according to the invention which has the features of the appended independent claim 1.

[0018] Advantageous embodiments of the invention are stated in the dependent claims.

[0019] Substantially the device according to the invention for the transverse cutting of laminated films at V-shaped die cuts provided on this film at distances corresponding to the length of bags to be produced comprises a pair of blades spaced one from the other, such as to be arranged on either side of an apex of said die cuts during said transverse cutting.

[0020] Said pair of blades is carried by a carriage movable along a linear guide placed transversely to the film.

[0021] Said blades are mounted on a blade holder housed in a channel obtained in a fixed block placed transversely to the film and protrude below this block through a narrow opening of said channel.

[0022] Further features of the invention will be made clearer by the following detailed description, referred to one of its embodiments purely by way of a non-limiting example, illustrated in the accompanying drawings, in which:

Figures 1, 2 and 3 are schematic plan views showing successive phases during the transverse cutting of a tubular film for the separation of bags with elimination of the "nib" according to the prior art;

Figure 4 is a plan view substantially similar to the preceding figures, showing a film with forward movement from right to left which is subjected to transverse cutting with the device according to the invention;

Figures 5 and 6 are schematic section views taken in the direction of forward movement of the film, of the cutting device according to the invention, shown respectively in rest and work position;

Figure 7 is a partial schematic view, with parts removed, taken from the left with respect to Figure 5. Figure 4 shows schematically in plan view a film 1 in an intermediate phase of the process of production of bags.

[0023] The film is unwound from a roll and made to move forwards initially continuously via a succession of stations, where it undergoes in particular a longitudinal

folding to form a tubular shape, and subsequently intermittently in order to be subjected to operations which require that the film be at a standstill.

[0024] In the plant or machine for the production of bags, which will not be described in detail in that not forming an object of the invention, a device is provided for transforming from continuous to intermittent the forward movement of the film.

[0025] The film 1 shown in Figure 4 is downstream of such a device and therefore undergoes stops during the forward movement in order to be subjected to the various operations to be performed on the stopped film, such as welds, incisions, die cuts, transverse cutting and so on.

[0026] In the position of Figure 4, the film 1 which is a laminate comprising at least one layer of aluminium or in any case a material with a certain rigidity, has been folded longitudinally to form a tubular shape, and on it V-shaped die cuts have been formed with rounded edges, at transverse lines 5 placed at a distance corresponding to the length of the bag which is intended to be obtained.

[0027] As mentioned previously, these die cuts 2 are performed to prevent the bags produced from having sharp edges.

[0028] Nevertheless, in order to avoid the formation of sharp corners, that is of the "nib" 6 (Figure 2), it would be necessary to perform the transverse cutting exactly at the apex 3 of the V-shaped die cut 2, that is along the line 5, which, as seen previously, is practically impossible due to the small inaccuracies during the forward movement of the film 1, which do not allow the stop in the phase of transverse cutting to be determined with precision.

[0029] In order to solve this problem, unlike what occurs in the prior art, which provides for two successive cuts, as shown in Figures 1 to 3, the invention proposes the cutting device shown in Figures 5 to 7, denoted overall by reference numeral 10.

[0030] The device 10 comprises two blades 11, 12 appropriately distanced one from the other, for example by approximately 2 mm, carried by an L-shaped plate 20 overturned and tipped through 180°, attached to a second overturned L-shaped plate 21, in turn attached to a carriage 22 sliding transversely on a linear guide 23 placed transversely to the machine.

[0031] The plates 20, 21 and the carriage 22 form a whole so that here below these elements will be identified also with the single carriage 22.

[0032] The carriage 22 is moved by means of a toothed belt 24 attached to the upper plate 21 by means of counter plates 25.

[0033] The toothed belt 24 is actuated in reciprocal motion by means of a motor and respective pinion, not shown.

[0034] Naturally the carriage 22 can be moved in another way, for example by means of a worm screw and lead screw, pneumatic actuators and the like.

[0035] The blades 11 and 12 are carried by a blade holder 26 which runs along a channel 27 formed in a

block 30 integral with the structure of the machine (Figures 5 and 6).

[0036] The channel 27 is open above to allow the insertion therein of the blade holder 26, and opens below in a funnel to allow the exiting of the blades 11 and 12 which project slightly beyond the lower plane 31 of the block 30.

[0037] In Figures 5 and 6 the film 1 has been schematised with a dotted line and is moved intermittently from right to left as indicated by the arrows F.

[0038] Below the block 30 two pressers 32 are placed, movable vertically as indicated in the arrows F1 to move from a distanced position from the block 30, as shown in Figure 5, to allow the forward movement of the film 1, to a portion of blocking of the film 1 against rubber stoppers 33 provided in the block 30 during the phase of stopping of the film, as shown in Figure 6.

[0039] The cutting of the film 1 is performed with a single stroke of the carriage 22 which moves along the linear guide 23 transversely to the film in one direction or in the other.

[0040] During the cutting the debris material 4 (Figure 6) is evacuated between the two pressers 32 by means of puffs of air emitted by nozzles 35 placed at regular intervals in the block 30, which direct the air in the channel 27, as shown in Figure 6.

[0041] After each transverse stroke of the carriage 22, the blades 11 and 12 remain outside of the trajectory of the film 1, which can therefore be made to move forwards, as shown in Figure 5, to then be blocked by the pressers 32 in the subsequent stopping phase, as shown in Figure 6, and be once again cut transversely in the stroke of return of the carriage 22.

[0042] The plan view of Figure 4 schematises the double cutting which is performed transversely to the film 1 with the device according to the invention, producing the elimination from the film of a transverse strip 4 of material, whose width d corresponds to the centre distance between the blades 11, 12.

[0043] In the same Figure 4, by way of explanation the lines have been indicated by dotted lines along which the double cutting is performed on either side of the apices 3 of the V-shaped die cuts 2.

[0044] From what is disclosed the advantages of the device according to the invention appear clear, which allows with a single double cut to avoid the formation of sharp edges or "nibs" in the process of production of bags for flexible packaging.

[0045] Naturally the invention is not limited to the particular embodiment described previously and illustrated in the accompanying drawings, but numerous detail changes may be made thereto, within the reach of the person skilled in the art, without thereby departing from the scope of the same invention, as defined by the appended claims.

Claims

1. Device for the transverse cutting of laminated films (1) at V-shaped die cuts (2) provided on said film at distances corresponding to the length of bags to be produced, **characterised in that** said device (10) comprises a pair of blades (11, 12) spaced one from the other, such as to be arranged on either side of an apex (3) of said die cuts (2) during said transverse cutting. 5 10
2. Cutting device according to claim 1, **characterised in that** said blades (11, 12) are carried by a carriage (22) movable along a linear guide (23) placed transversely to said film (1). 15
3. Cutting device according to claim 2, **characterised in that** said blades (11, 12) are mounted on a blade holder (26) housed in a channel (27) obtained in a fixed block (30) placed transversely to the film (1) and protrude below the block (30) through a narrow opening of said channel (27). 20
4. Cutting device according to claim 3, **characterised in that** it comprises a pair of pressers (32) located below the block (30) and movable vertically to abut against rubber stops (33) provided in said block (30) to block the film (1) during the cutting phase. 25
5. Cutting device according to claim 3 or 4, **characterised in that** nozzles (35) blowing air into said channel (27) are provided along said block (30) for evacuating the debris material (4) through the lower opening of said channel (27). 30 35
6. Cutting device according to any one of the preceding claims, **characterised in that** said carriage (22) is actuated in reciprocal motion by means of a motor-driven toothed belt, by means of a lead screw /screw mechanism, by means of pneumatic actuators or similar means. 40
7. Cutting device according to any one of the preceding claims, **characterised in that** said blades (11, 12) are at a distance of about 2 mm. 45
8. Method for transverse cutting of a laminated film (1) for the production of bags, said film (1) having been previously subjected to V-shaped die cuts (2) at distances corresponding to the length of the bags to be produced, **characterised in that** a double cut is provided, performed simultaneously with a pair of blades (11, 12) that are arranged on either side of the apices (3) of said V-shaped die cuts (2). 50 55
9. Method according to claim 8, wherein during said double cutting an evacuation of a debris material (4) is provided by means of air blowing.
10. Method according to claim 8 or 9, wherein, during the cutting, a blockage of the film (1) is provided by means of a pair of pressers (32) against rubber stops (33) provided in a block (30) from which said blades (11, 12) project.

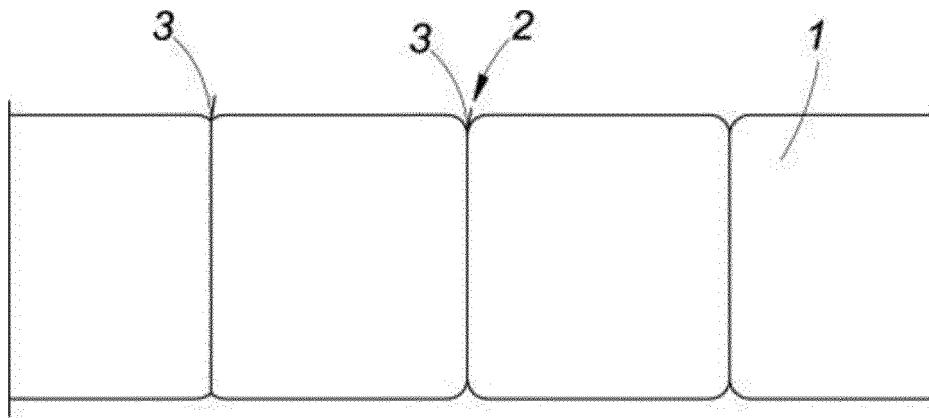


FIG. 1

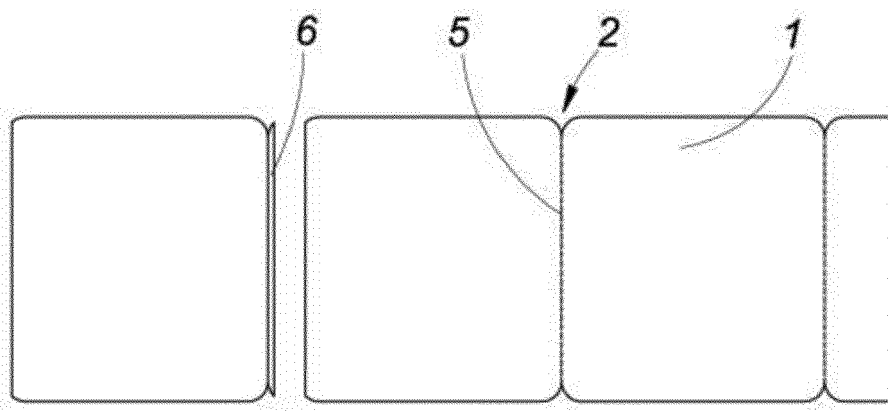


FIG. 2

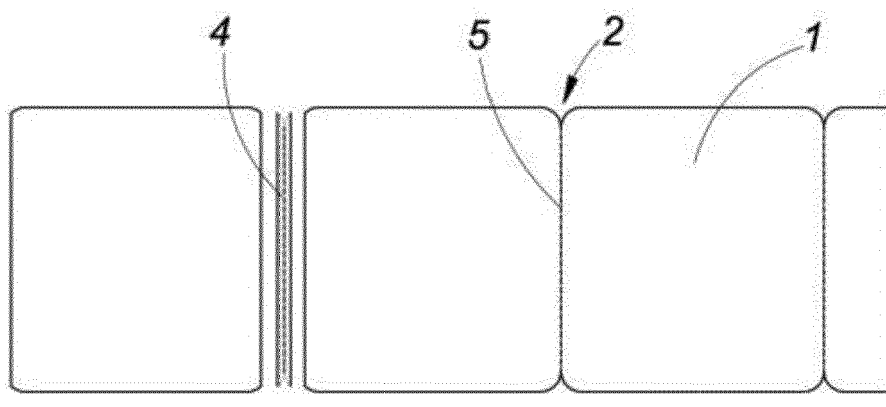


FIG. 3

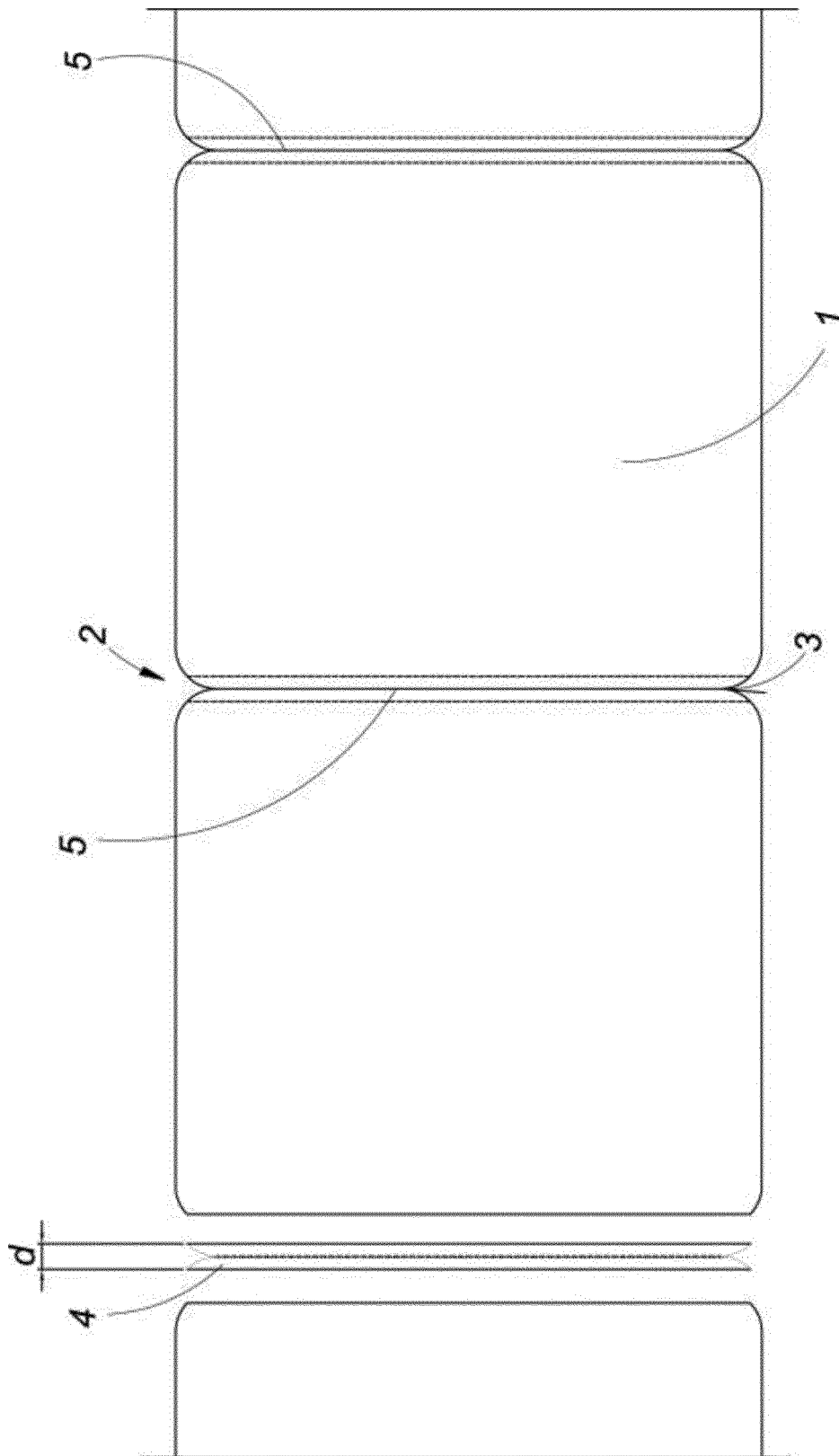


FIG. 4

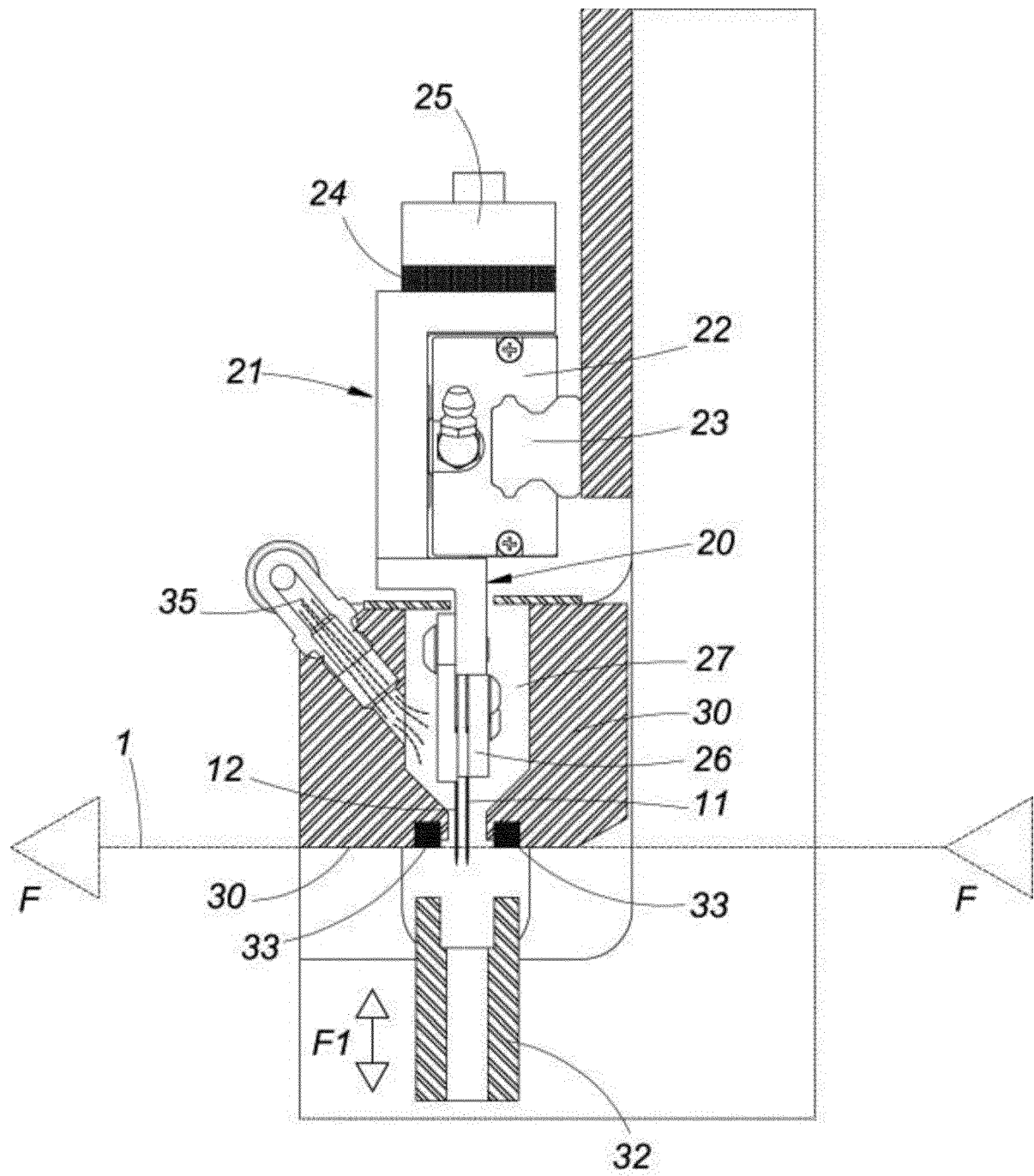


FIG. 5

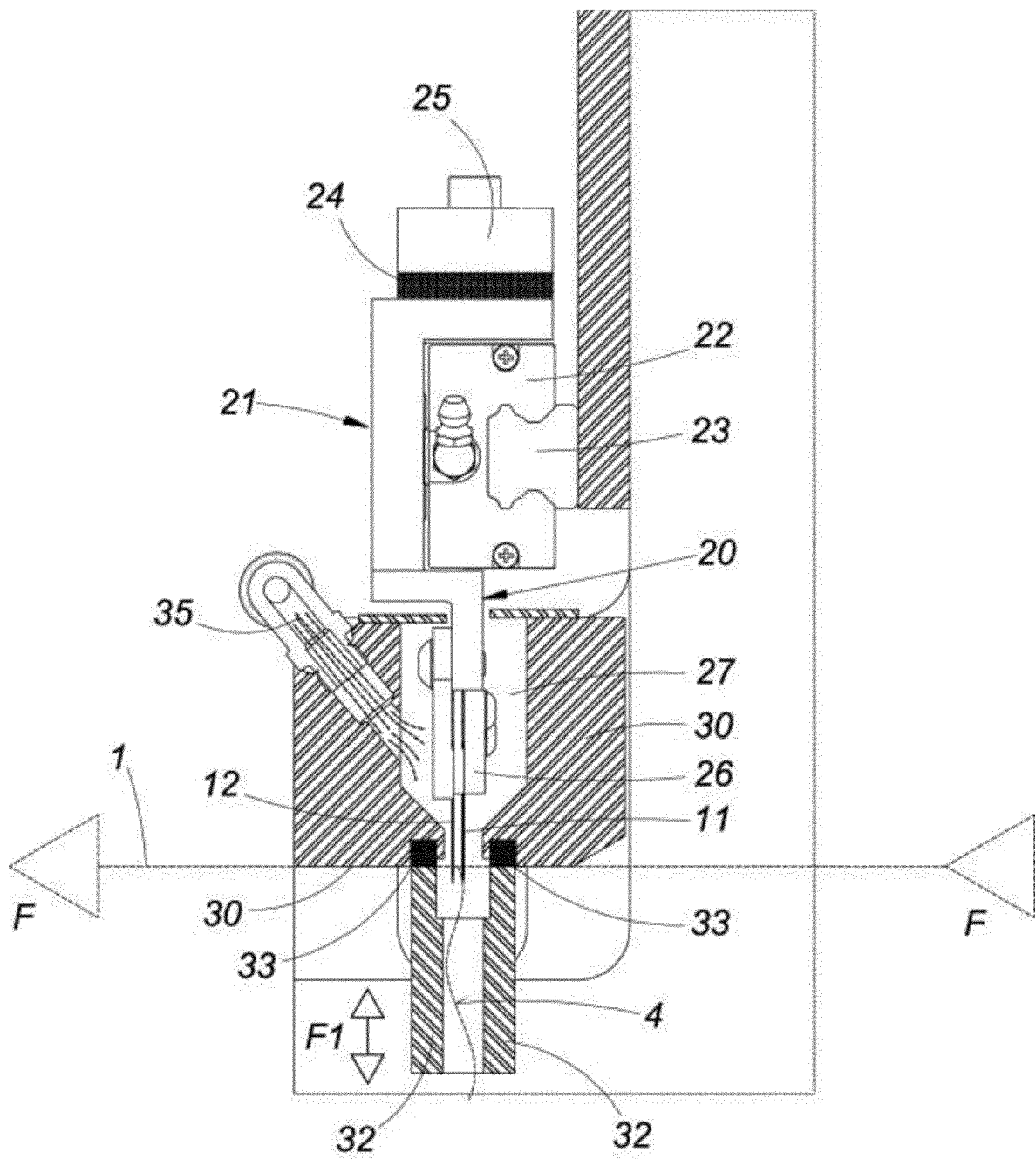


FIG. 6

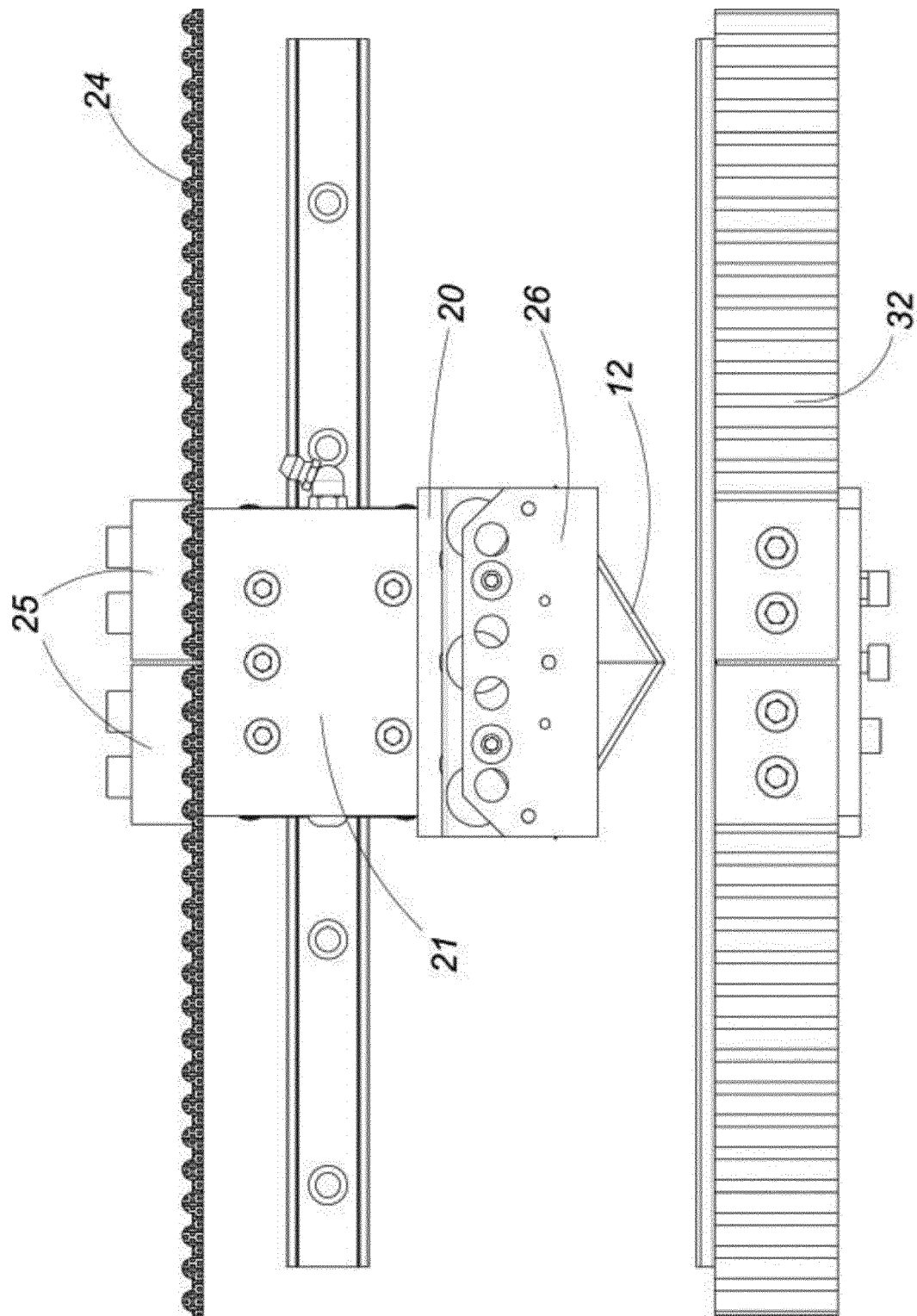


FIG. 7



EUROPEAN SEARCH REPORT

Application Number
EP 18 17 2308

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 2 230 067 A2 (MOBERT SRL [IT]) 22 September 2010 (2010-09-22) * A machine for producing and winding at least one strip of pre-cut bags with die-cut handles, comprising a die-cutting station (7), acting on a portion of tubular film (2) whose sliding is stopped by stopping means (8-14).; paragraph [0013] - paragraph [0034]; figures 1,2 *	1-10	INV. B26D1/11 B26D7/02 B65H35/06 B26D3/14 B26D7/18 B26D5/08 B26D7/01
A	US 2015/174778 A1 (BABA KENJI [JP] ET AL) 25 June 2015 (2015-06-25) * A trimming apparatus for cutting a sheet bundle with a reciprocating cutter unit having two blades 21, 22 and press means 10 to hold the position of the sheet bundle on a bed surface 2.; paragraph [0024] - paragraph [0028]; figures 1,2 *	1,8	TECHNICAL FIELDS SEARCHED (IPC) B26D B65H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 October 2018	Examiner Maier, Michael
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	

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EP 18 17 2308

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		IT 1394527 B1	05-07-2012

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