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(54) **CONTAINER CUTTING DIE**

(57) The patent relates to a container cutting die, comprising a die plate (1) and a punch and blade holder plate (2) enabled for relative movement between an in-operative or open position in which the blades (3) and the punches (4) are spaced from the die plate (1), and an operative closed position in which the blades (3) and the punches (4) make, in combination with the die plate (1), cuts and/or precuts in the containers. The blades (3)

have a body (31) with a non-circular cross section housed in a tight manner, and fixed by means of a clamping element (5), in a housing (21) of the plate (2) having a cross section coinciding in shape and dimensions with the cross section of the body (31) of the blades (3), and in which the front end (32) of the blades projects a distance of less than 10 millimetres from the punch and blade holder plate (2).

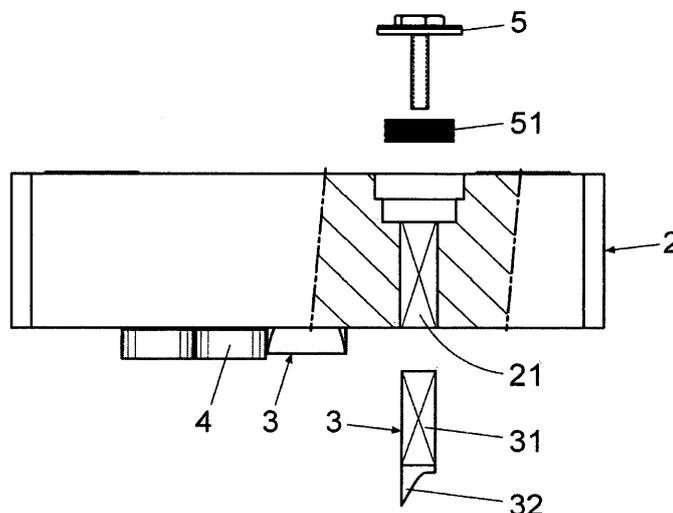


Fig. 3

EP 3 566 834 A1

Description

Object of the invention

[0001] The object of the present invention is a container cutting die, which has features suitable for making a cut in plastic materials for example PLA, PET, PP-type materials and other complex films of different structures and thicknesses, particularly applicable in the manufacture of packages for food use; with the guiding and shapes of punch holders, punches and blades with an opening of less than 10 millimetres.

Field of application of the invention

[0002] This invention is applicable in machines for cutting containers and preferably, though not in a limiting manner, of containers intended for the food industry.

State of the art

[0003] In the manufacture of containers and in particular of containers for the food industry, it is common to use cutting dies provided with a die plate and a punch and blade holder plate, enabled for relative movement with respect to the die plate between: an inoperative or open position, and an operative closed position in which the blades and punches make the cut and/or precut on the material of the containers.

[0004] In dies used today for performing these cutting operations, the forward positioning of the blades with respect to the punch and blade holder plate is 20 to 25 millimetres; with this length and given that the cross section of the blades is smaller than the cross section of the punches, said blades are very sensitive to lateral forces produced during cutting or precutting operations of the containers, so there is a risk of interference of the blades with the die plate during the forward movement thereof towards the closed position, which causes accelerated deterioration of the cutting edge of the blades and a low quality of the cut made by said blades.

[0005] In this sense, it should be mentioned that the deterioration of the edge of the blades causes filaments and irregular ridges in the container cutting areas to be formed, and these are the main concerns of manufacturers and consumers of packaged products.

[0006] Therefore, the technical problem that is considered is introducing improvements in these cutting dies in relation to the blades, which improvements allow the problems set forth above to be solved in a satisfactory manner.

Description of the invention

[0007] The cutting die object of the present invention, comprising a die plate and a punch and blade holder plate, has improved features in relation to the blades of the punch holder plate, aimed at preventing the bending

of the cutting blades and possible interferences with the die plate; and accordingly increasing cutting duration and precision.

[0008] Another objective of the invention is to provide the blades with a shape that ensures better guiding and especially a perfect housing in the punch plate and the blades.

[0009] Another objective of the invention is to increase the service life and reliability of the precuts made by the blades in the containers.

[0010] To achieve the proposed objectives, the cutting blades have a body with a non-circular cross section housed in a tight manner and fixed in a housing having a cross section coinciding in shape and dimensions with the cross section of the body of the blades; such that the front end of the blades projects a distance of less than 10 millimetres from the punch and blade holder plate.

[0011] The forward positioning of the blades by a distance of less than 10 millimetres, instead of the 20 to 25 millimetres observed in dies existing on the market, prevents said blades from being able to laterally bend due to the lateral forces which are produced during cutting or precutting of the containers, thereby preventing the risk of interference of the edge of the blades with the die plate, so a very long service life of the blades and a much higher quality of the cut container or product are assured.

[0012] According to the invention, the housing of the punch and blade holder plate and the body of the blades have a rectangular cross section, ensuring better guiding and particularly a perfect housing of the blades by performing at the same time and in the same machine of the punch and blade holder plate other machining for columns and fasteners of the punch and blade holder plate.

[0013] The mentioned rectangular cross section of the blades and of the housings of the punch and blade holder plate provides a very high precision in the positioning of the blades.

[0014] The use of specific metal carbide has also been envisaged in this invention for the purpose of increasing the service life and reliability of the precutting of the containers, which is a very important parameter for the subsequent separation of the containers in the case of the manufacture of product packs, for example yogurt packs.

Description of the figures

[0015] As a complement to the description provided herein, and for the purpose of helping to make the characteristics of the invention more readily understandable, the present specification is accompanied by a set of drawings which, by way of illustration and not limitation, represent the following:

- Figure 1 shows a schematic elevation view of a container cutting die, according to the invention, in an inoperative open position.
- Figure 2 shows a view similar to the preceding one, in which the die is depicted in an operative cutting

position.

- Figure 3 shows an elevation view of an embodiment of the punch and blade holder plate partially sectioned by one of the housings of one of the blades, and in which the corresponding blade is depicted in an exploded view and aligned with said housing.
- Figure 4 shows a view similar to the preceding one in which the blade is depicted assembled in the corresponding housing of the punch and blade holder plate.

Preferred embodiment of the invention

[0016] As can be observed in Figures 1 and 2, the cutting die for containers comprises a die plate (1) and a punch and blade holder plate (2) enabled for relative movement between an inoperative or open position, depicted in Figure 1, in which the blades (3) and the punches (4) of the plate (2) are spaced from the die plate (1), and an operative closed position, depicted in Figure 2, in which the blades (3) and the punches (4) make, in combination with the die plate (1), cuts and/or precuts in the containers (not depicted) previously positioned in the die plate (1).

[0017] In Figures 3 and 4 it can be observed that the blades (3) have a body (31) with a non-circular cross section, in this specific case rectangular cross section, housed in a tight manner and fixed with the possibility of being extracted in a housing (21) of the punch and blade holder plate (2) such that in the assembly position, shown in Figures 1 and 4, the front end (32) of the blades (3) projects a distance of less than 10 millimetres from the punch and blade holder plate (2).

[0018] In a preferred embodiment, the mentioned front end (32) of the blades (3) projects 7 millimetres from the punch and blade holder plate (2), this length being sufficient to assure correct operation of the die, making the cut or precut in the material of the container and preventing the lateral bending or deviation of the blades, and the deterioration of their cutting edge, due to the lateral stresses produced during cutting or precutting of the containers.

[0019] In the embodiment shown in Figures, and as can be observed with greater clarity in the exploded view of Figure 3, the blades (3) are fixed at their rear end by a removable clamping element (5), depicted by a screw which passes through a separator (51) and is screwed onto the rear end of the corresponding blade (3).

[0020] The assembly of the clamping element or screw (5) and of the separator element is done at the upper part of the punch and blade holder plate (2) by contacting the mentioned separator (51) in the front portion with a step acting as a stop defined in the mentioned punch and blade holder plate (2).

[0021] In this specific embodiment, the blades (3) are manufactured in high mechanical strength metal carbide for the purpose of assuring the durability of the cutting edge.

[0022] Having sufficiently described the nature of the invention, in addition to a preferred exemplary embodiment, it is hereby stated for the relevant purposes that the materials, shape, size and layout of the described elements may be modified, provided that it does not imply altering the essential characteristics of the invention claimed below.

10 Claims

1. A container cutting die; comprising a die plate (1) and a punch and blade holder plate (2) enabled for relative movement between an inoperative or open position in which the blades (3) and the punches (4) of the punch and blade holder plate (2) are spaced from the die plate (1), and an operative closed position in which the blades (3) and the punches (4) make, in combination with the die plate (1), cuts and/or precuts in the containers; **characterised in that** the blades (3) have a body (31) with a non-circular cross section housed in a tight manner, and fixed by means of a clamping element (5), in a housing (21) of the plate (2) having a cross section coinciding in shape and dimensions with the cross section of the body (31) of the blades (3), and in which the front end (32) of the blades (3) projects a distance of less than 10 millimetres from the punch and blade holder plate (2).
2. The die according to claim 1, **characterised in that** the housing (21) of the punch and blade holder plate (2) and the body (31) of the blades (3) have a rectangular cross section.
3. The die according to claim 1, **characterised in that** the blades (3) are manufactured in a high mechanical strength metal carbide.

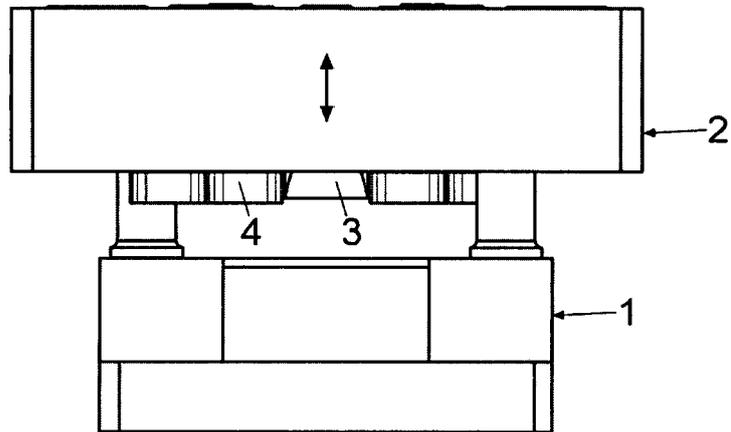


Fig. 1

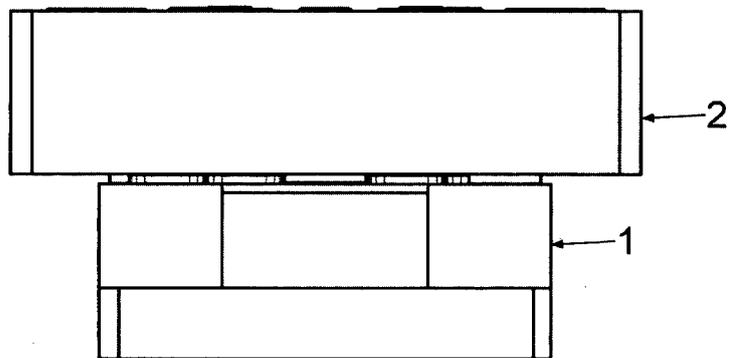


Fig. 2

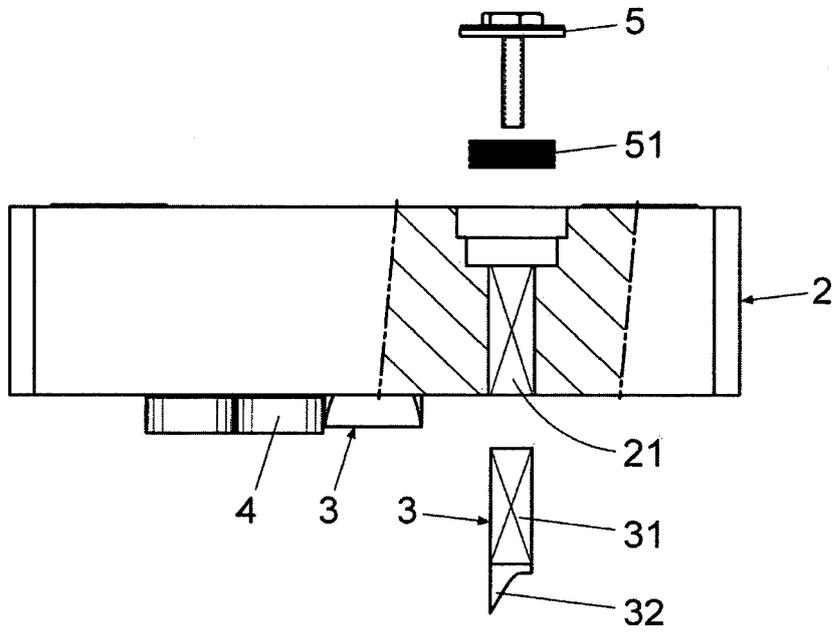


Fig. 3

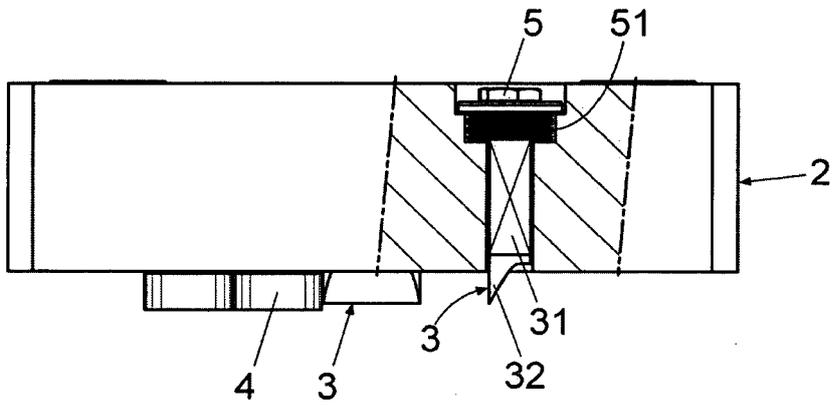


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 19 00 0208

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y	FR 2 636 256 A1 (PIGNON GUY [FR]) 16 March 1990 (1990-03-16) * figures 1-3 *	1-3	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B26D B26F
Place of search		Date of completion of the search	Examiner
Munich		19 September 2019	Wimmer, Martin
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	

EPO FORM 1503 03/02 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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19-09-2019

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