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(54) **DEVICE FOR DIE-CUTTING AND EJECTING ELASTOMER STOPPERS**

(57) The invention relates to a device for die-cutting and ejecting elastomer stoppers comprising: - a cutting matrix (5), - a series of punches (4) facing cavities of the cutting matrix (5) and fastened to a vertically movable punch holder plate (41), and - ejection means of the stoppers retained in the matrix which consist of ejectors (2) that pass through the punches (4) and are arranged facing the cavities of the cutting matrix (5) for mechanically extracting the stoppers, said ejectors (2) being fastened to an ejector holder plate (1) connected to an actuating cylinder (10) by means of a ball joint (11) and a ball joint extension (12) that is fastened to said ball joint (11) by means of a detachable flange (13) that enables the disconnection thereof in order to manually replace the ejector holder plate (1).

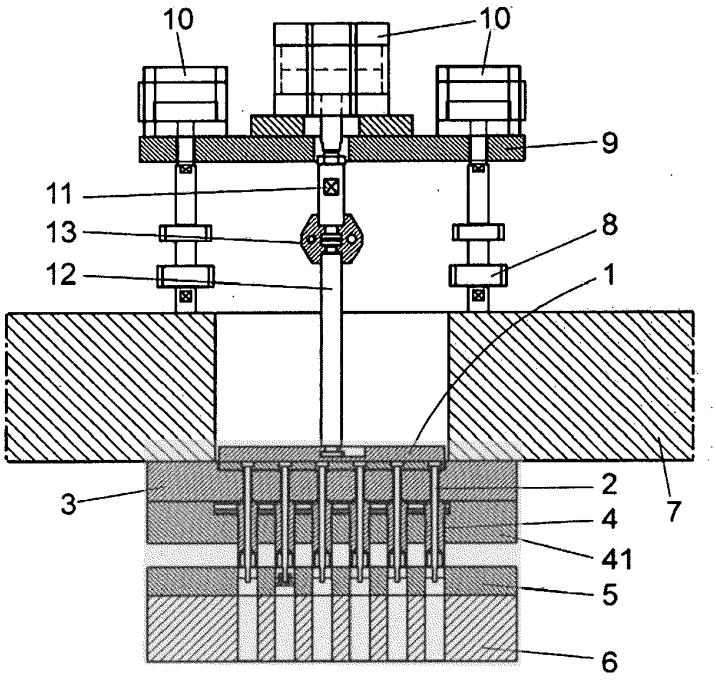

Fig. 1

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Description

Technical field

[0001] The present invention relates to a device for die-cutting and ejecting elastomer stoppers comprising: - a cutting matrix, - a series of punches facing the cavities of the matrix and fastened to a punch holder plate assembled in an upper cutting cross member, with the possibility of vertical movement, and - means for ejecting the stoppers retained in the matrix.

[0002] This invention is applicable to the field dedicated to the manufacture of elastomer stoppers and has technical characteristics that enable the stoppers to be mechanically ejected and ejecting means to be manually disassembled and replaced in order to adapt them to different formats of the product to be manufactured.

Background art

[0003] Devices used for manufacturing stoppers by die-cutting an elastomer strip that is arranged on a cutting matrix and comprising vertically movable punches and which carry out the die-cutting of the elastomer band when introduced into cavities of the matrix are currently known.

[0004] One of the drawbacks of this type of device is the risk that the elastomer stoppers or residue are retained in the cavities of the matrix, the ejection thereof being necessary.

[0005] In this this type of device, it is common to use pneumatic means to eject the stoppers once they are cut, each punch having pneumatic elements for projecting compressed air and accomplishing ejection by blowing said stoppers or scraps that may be retained in the matrix.

[0006] These pneumatic ejectors do not provide the necessary safety when removing the stoppers and, given the type of installation, they also do not allow for the interchangeability of the system. This means that said devices have limits on producing stoppers of different sizes, in other words, they are only capable of producing one type of stopper, making the machine unadaptable and as a result, not very versatile.

[0007] The applicant of the present invention is unaware of the existence of prior art that solves the problem set forth previously.

[0008] Therefore, the technical problem that is proposed is the development of a device for die-cutting and ejecting elastomer stoppers that ensures the complete ejection of the stoppers and that can be easily adapted to change the format of the product.

Description of the invention

[0009] The device for die-cutting and ejecting elastomer stoppers object of this invention has technical characteristics intended to solve the aforementioned problem; specifically: on one hand, to ensure the ejection of the stoppers, and on the other hand, to quickly change the format of the product.

[0010] To do so, and according to the invention, this device comprises means for mechanically extracting the stoppers, consisting of ejectors that pass through the entire cutting system and push the stoppers until freeing them from the lower cutting matrix or tool.

[0011] These ejectors are fastened to an ejector holder plate connected to an actuating cylinder by means of a ball joint fastened to a ball joint extension by means of a detachable flange; enabling said detachable flange to quickly change the format of the product to be manufactured, manually replacing the ejector holder plate.

[0012] These mechanical ejection means prevent possible production contamination since said device is intended to cut different materials and each material has a specific purpose, for example, in the pharmaceutical industry.

[0013] This mechanical ejection ensures that the material is ejected until the end, ensuring that no stopper or any residue from prior production remains housed inside the tool.

[0014] Therefore, with this device the cutting system that is required is successfully adapted, improving productivity and creating a universal and versatile machine that can work with different formats.

Brief description of the content of the drawings

[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 an exemplary embodiment of the device for die-cutting and ejecting elastomer stoppers according to the invention.

- Figure 2 shows a view similar to the preceding figure wherein the ball joint extension has been disassembled in order to change the format of the product, manually replacing the ejector holder plate.

Detailed description of embodiments of the invention

[0016] As can be seen in Figure 1, this device comprises an ejector holder plate (1) wherein the ejectors (2) that pass through an intermediate plate (3) and the punches (4) mounted on a punch holder plate (41) are fastened and which are arranged facing the cavities of a matrix (5) mounted on a matrix holder plate (6).

[0017] This device comprises an upper cutting cross member (7) on which a support plate (9) of actuating

cylinders (10) is assembled by means of supports (8).

[0018] The cylinder (10) that occupies the central position in the figure is the one responsible for moving the ejector holder plate (2) and is connected to said ejector holder (2) by means of a ball joint (11) and a ball joint extension (12) fastened to said ball joint (11) by means of a detachable flange (13) that enables the disconnection thereof in order to manually replace the ejector holder plate (1) as shown in Figure 2 and to change the format of the product.

[0019] Having sufficiently described the nature of the invention, in addition to an example of a preferred 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.

Claims

1. A device for die-cutting and ejecting elastomer stoppers comprising: - a cutting matrix (5), - a series of punches (4) facing cavities of the cutting matrix (5) and fastened to a vertically movable punch holder plate (41), and - ejection means of the stoppers retained in the matrix; **characterised in that** the ejection means consist of ejectors (2) that pass through the punches (4) and are arranged facing the cavities of the cutting matrix (5) for mechanically extracting the stoppers, said ejectors (2) being fastened to an ejector holder plate (1) connected to an actuating cylinder (10) by means of a ball joint (11) and a ball joint extension (12) that is fastened to said ball joint (11) by means of a detachable flange (13) that enables the disconnection thereof in order to manually replace the ejector holder plate (1).

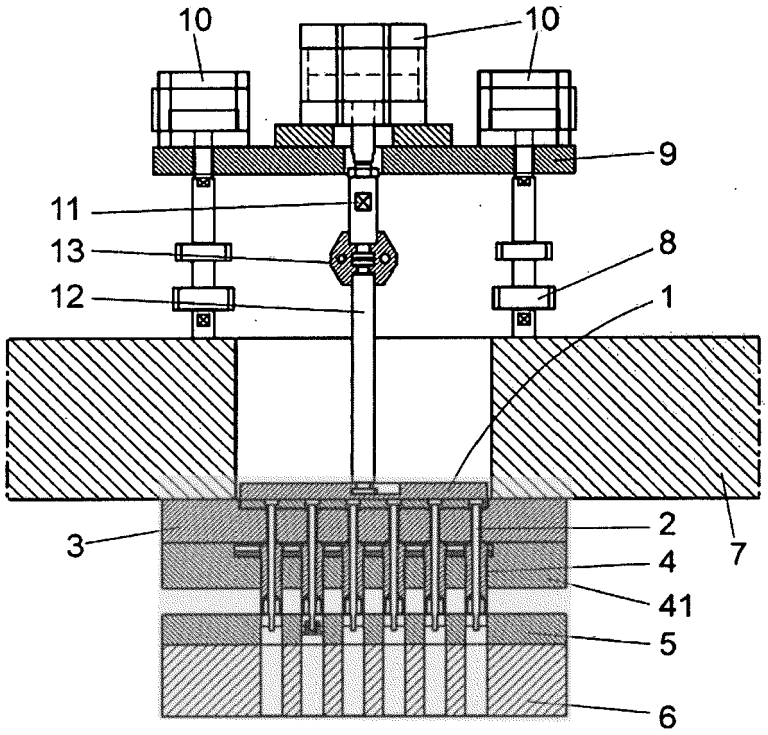

Fig. 1

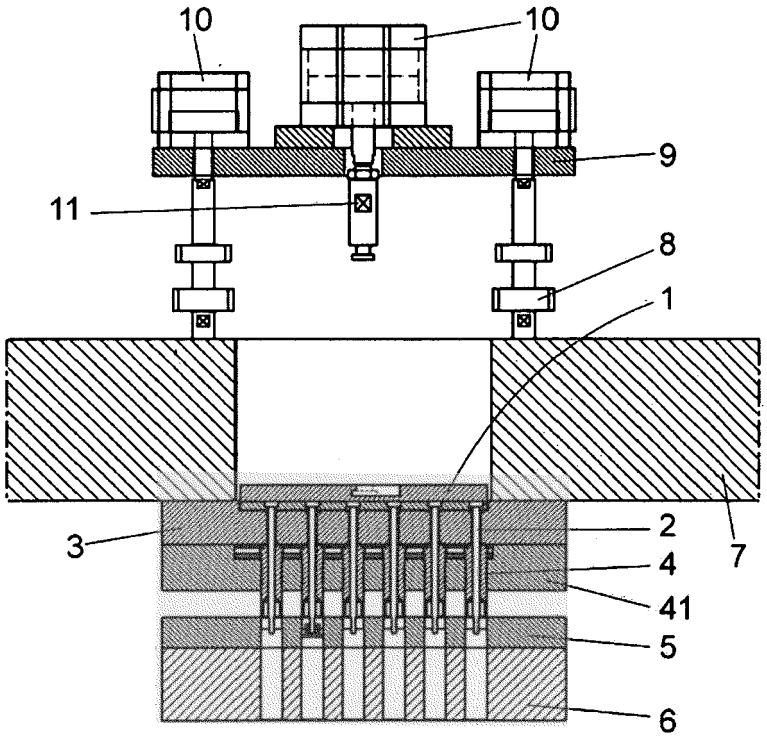

Fig. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 18 00 0912

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	US 3 217 574 A (NAUTA HOWARD J ET AL) 16 November 1965 (1965-11-16) * the whole document *	1	INV. B26F1/02 B26D7/18
A	FR 2 553 700 A1 (DUBRASQUET SOLANGE [FR]) 26 April 1985 (1985-04-26) * abstract; figure 1 *	1	
A	FR 2 387 103 A1 (STIEGLER MASCHF FELIX [DE]) 10 November 1978 (1978-11-10) * figures *	1	
A	EP 0 068 068 A2 (BARTESAGHI ANGELO) 5 January 1983 (1983-01-05) * page 6, line 1 - line 4; figures *	1	

TECHNICAL FIELDS SEARCHED (IPC)

B26F
B26D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	29 May 2019	Canelas, Rui

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 00 0912

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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29-05-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3217574 A	16-11-1965	NONE	
FR 2553700 A1	26-04-1985	NONE	
FR 2387103 A1	10-11-1978	BE 865914 A	31-07-1978
		DE 2716278 A1	26-10-1978
		FR 2387103 A1	10-11-1978
		GB 1577104 A	15-10-1980
		US 4160396 A	10-07-1979
EP 0068068 A2	05-01-1983	BR 8201058 A	11-01-1983
		CA 1178884 A	04-12-1984
		DE 3278493 D1	23-06-1988
		EP 0068068 A2	05-01-1983
		ES 8302493 A1	16-01-1983
		IT 1135615 B	27-08-1986
		US 4516457 A	14-05-1985

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82