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(54) **AUTOMATED DEVICE FOR MANUFACTURING ELASTOMER STOPPERS**

(57) This invention relates to an automated device for manufacturing elastomer stoppers, comprising: a frame (1), a cutting matrix, a cutting head (3) provided with vertically movable cutting punches (31), a double-cutting matrix (2) mounted on a movable table (4) and which has a number of cavities equal to double the number of punches (31) of the cutting head (3); runners (41) for movement of the movable table (4) on longitudinal rails (11) of the frame (1), a spindle (42) that acts on runners of the movable table and that is connected to a motor (43) that causes linear movement of the movable table (4) through a series of work areas, comprising: - a loading area of elastomer plates (P); - a first cutting area; - a second cutting area and; - a scrap removal area.

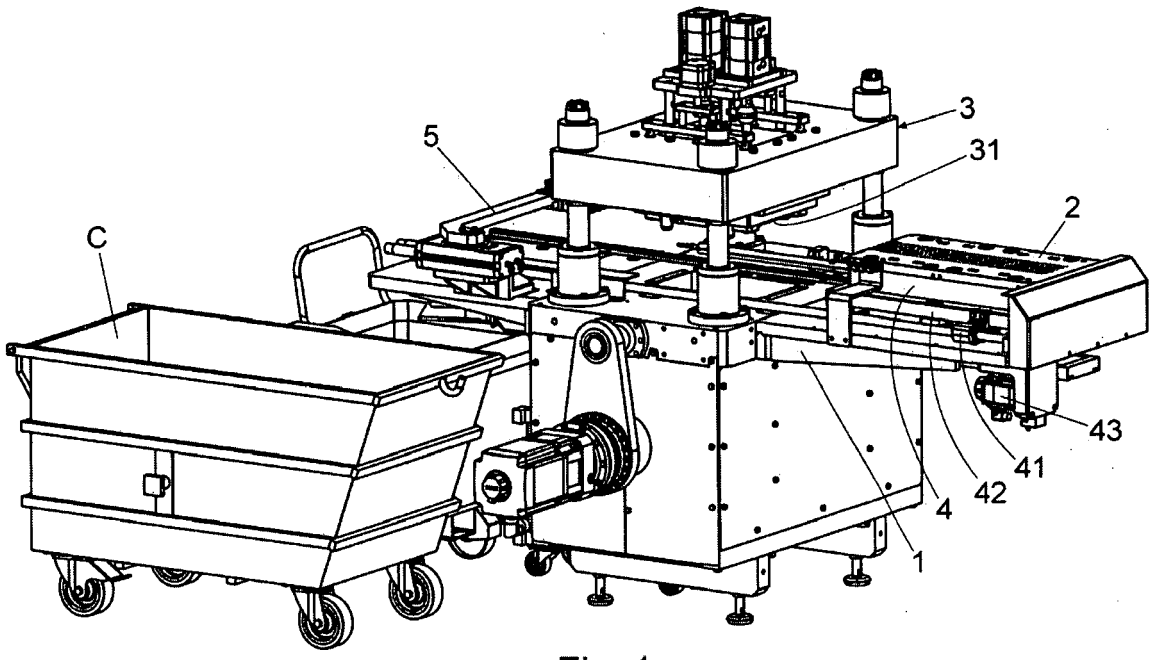

Fig. 1

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Description

Technical field

[0001] The present invention relates to an automated device for manufacturing elastomer stoppers, by means of die-cutting elastomer strips or plates manually positioned on a cutting matrix.

[0002] This device is applicable to the manufacture of elastomer die-cut stoppers.

Background art

[0003] The installations currently used to manufacture elastomer stoppers are not completely automated, it being necessary for an operator to load the elastomer plates in a cutting station, and once the stoppers are obtained by die-cutting, the operator must manually remove the scraps and residue of the die-cut plate.

[0004] This operation leads to relatively low production, since part of the time is used for manually introducing and extracting the elastomer plates in the cutting device.

[0005] The applicant of the invention is unaware of the existence of prior art which makes it possible to satisfactorily solve this drawback.

[0006] Therefore, the technical problem that is proposed is the development of an automated device for manufacturing elastomer stoppers that enables production to be increased by up to 40% with respect to the devices used currently and to reduce the manufacturing process time.

Description of the invention

[0007] The automated device for manufacturing elastomer stoppers object of this invention is of the type described in the preamble of the first claim, i.e. which comprises: a frame, a cutting matrix and a cutting head having vertically movable cutting punches and which are introduced in cavities of the matrix, die-cutting an elastomer plate and obtaining the stoppers.

[0008] To achieve the proposed objectives, this device comprises: a double-cutting matrix mounted on a movable table and which has a number of cavities equal to the number of punches of the cutting head; runners for movement of the movable table on longitudinal rails fastened to the frame; and a spindle that acts on runners of the movable table and is connected to a motor that causes linear movement of the movable table through a series of work areas, comprising: a loading and positioning area on the double-cutting matrix of an elastomer plate; a first cutting area wherein the punches of the cutting head are housed in half of the cavities of the matrix, obtaining a series of stoppers by means of die-cutting a first part of the elastomer plate; a second cutting area wherein the punches of the cutting head are housed in the other half of the cavities of the matrix, obtaining another series of stoppers by means of die-cutting a second part of the elastomer plate and; a scrap removal area comprising a rotating arm having grippers and responsible for removing the excess material from the die-cutting of the elastomer plate from the device and depositing it in a scrap collecting cart.

[0009] The incorporation of the double-cutting matrix and the movement of said cutting matrix through the aforementioned stations and the synchronisation of the descent of the cutting head with the movements of the double-cutting matrix enables production to be increased by up to 40% and the manufacturing process time to be reduced, thus obtaining the proposed objectives.

Brief description of the content of the drawings

[0010] 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 rear perspective view of an exemplary embodiment of the automated device for manufacturing elastomer stoppers, according to the invention.
- Figure 2 shows a front perspective view of the device of the preceding figure.
- Figures 3, 4, 5 and 6 show schematic plan views of the device of Figures 1 and 2 wherein they show the cutting head only by means of a dotted outline and wherein the portable movable table of the cutting matrix is shown in the successive work areas.

Detailed description of embodiments of the invention

[0011] In the example shown, the device comprises a frame (1), a double-cutting matrix (2) and a cutting head (3) provided with vertically movable punches (31).

[0012] The double-cutting matrix (2) is mounted on a movable table (4) having runners (41) for longitudinal movement on rails (11) fastened to the frame (1).

[0013] The movement of the movable table is carried out by the action of a spindle (42) that acts on runners (41) of the movable table and that is connected to a motor (43) responsible for moving said movable table (4) along with the double-cutting matrix (2) mounted on the same through a series of consecutive work areas as shown in Figures 3 to 6.

[0014] Specifically, Figure 3 shows the movable table (4) in a loading area wherein an elastomer plate (P) is placed on the double-cutting matrix (2), from which elastomer stoppers will be obtained by die-cutting.

[0015] In Figure 4, the movable table (4) is shown in a first cutting area wherein the punches of the cutting head are housed in half of the cavities of the matrix, die-cutting a first part of the elastomer plate (P).

[0016] Next and as shown in Figure 5, the movable table moves to a second cutting area wherein the punches of the cutting head (3) are housed in the other half of the cavities of the double-cutting matrix (2), die-cutting a second part of the elastomer plate (P).

[0017] The double-cutting matrix (2) has a number of cavities equal to double the number of punches of the cutting head (3), which enables the punches (31) to die-cut the first half of the elastomer plate (P) in the first cutting area and the other half of the elastomer plate in the second cutting area, as shown in Figures 4 and 5.

[0018] Figure 6 shows the movable table (4) in a scrap removal area that, in this particular case, is in the second cutting area; and which comprises a pneumatically actuated rotating arm (5), having grippers (51) for gripping and removing the excess material from the previously die-cut elastomer plate (P), depositing it in a scrap collecting cart (C).

[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. An automated device for manufacturing elastomer stoppers, comprising: a frame (1), a cutting matrix and a cutting head (3) provided with vertically movable cutting punches (31) that are introduced in cavities of the cutting matrix, die-cutting an elastomer plate and obtaining the stoppers; **characterised in that** it comprises: a double-cutting matrix (2) mounted on a movable table (4) and which has a number of cavities equal to double the number of punches (31) of the cutting head (3); runners (41) for movement of the movable table (4) on longitudinal rails (11) of the frame (1), a spindle (42) that acts on runners of the movable table and that is connected to a motor (43) that causes linear movement of the movable table (4) through a series of work areas, comprising:

    - a loading and positioning area on the double-cutting matrix (2) of an elastomer plate (P);
    - a first cutting area wherein the punches (31) of the cutting head (3) are housed in half of the cavities of the double-cutting matrix (2), die-cutting a first part of the elastomer sheet (P);
    - a second cutting area wherein the punches (31) of the cutting head (3) are housed in the other half of the cavities of the double-cutting matrix (2), die-cutting a second part of the elastomer sheet (P); and
    - a scrap removal area comprising a rotating arm (5) having grippers (51) and responsible for removing the excess material from the die-cutting of the elastomer plate (P) and depositing it in a scrap collecting cart (C).

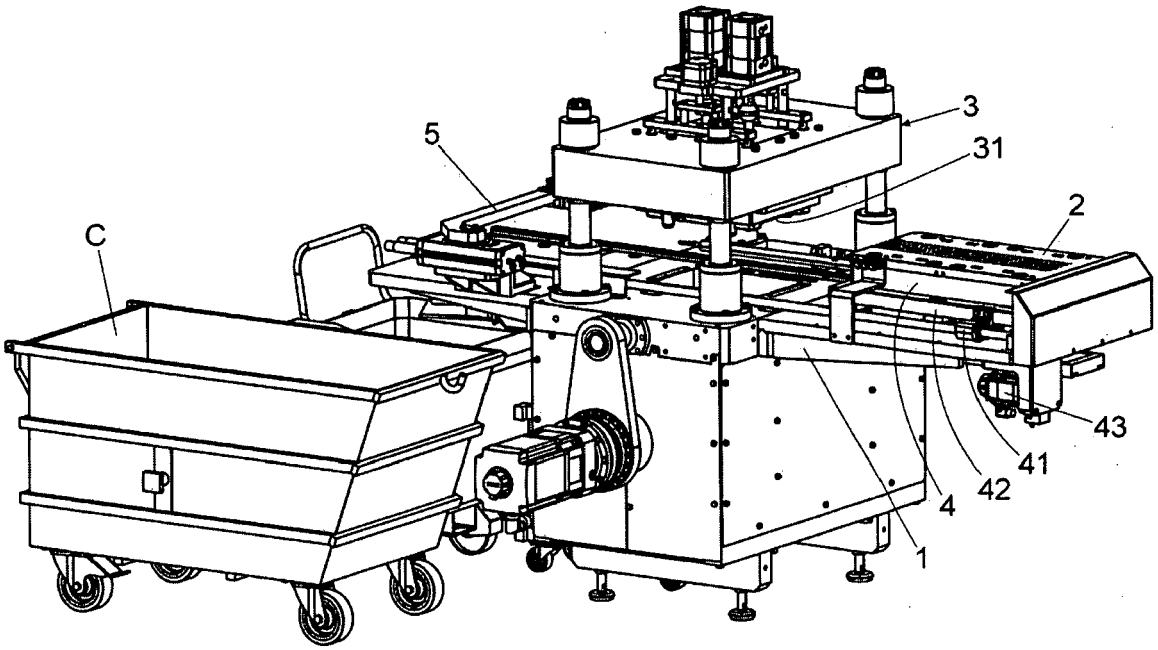

Fig. 1

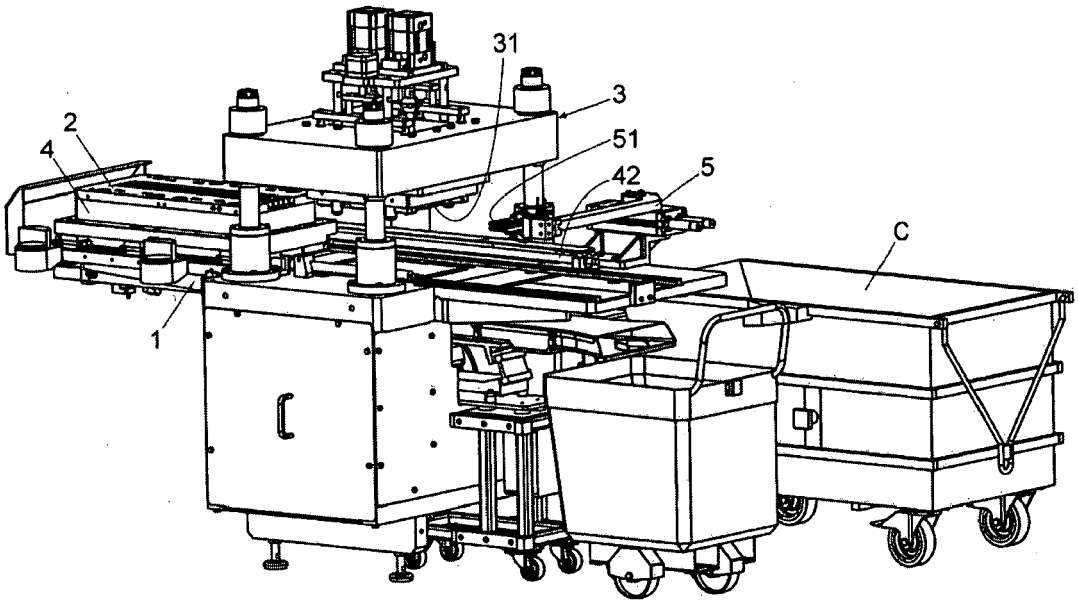

Fig. 2

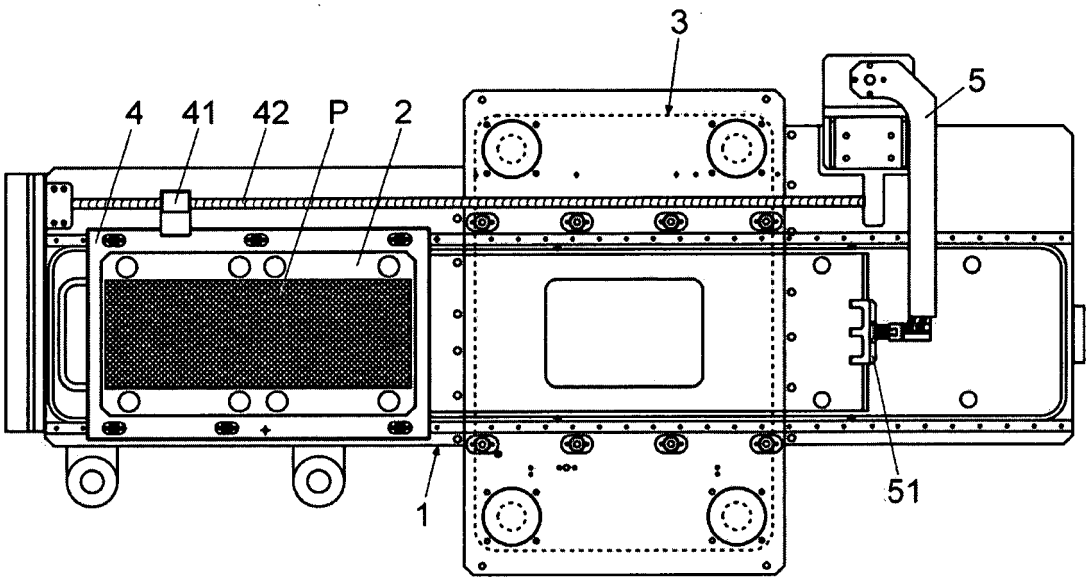

Fig. 3

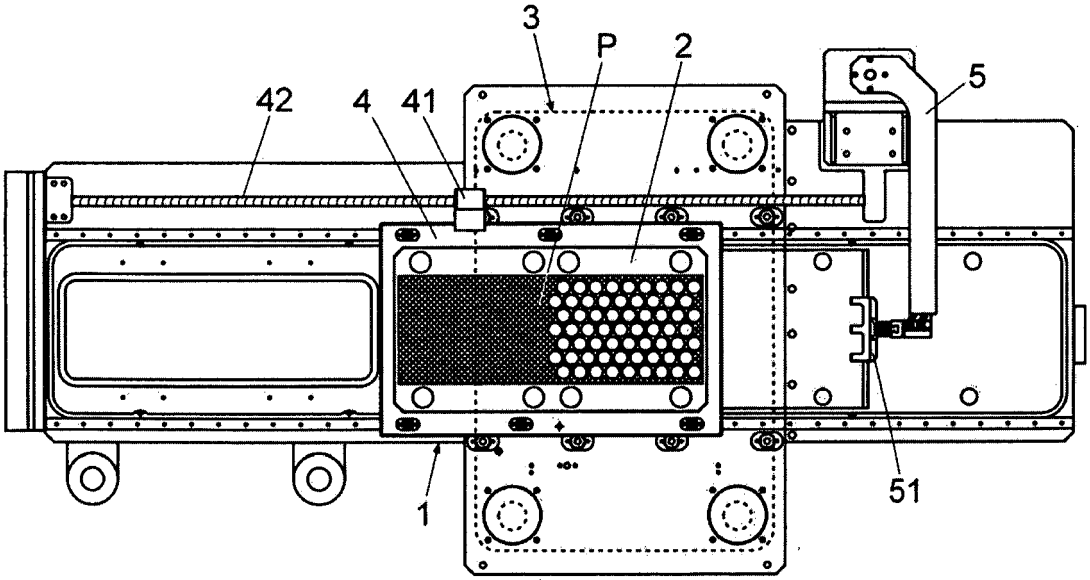

Fig. 4

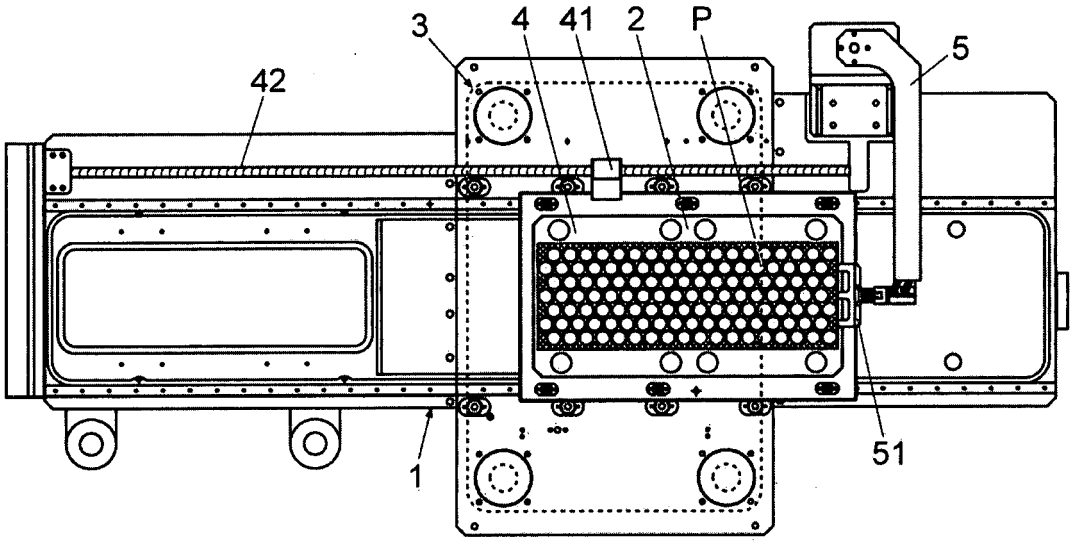

Fig. 5

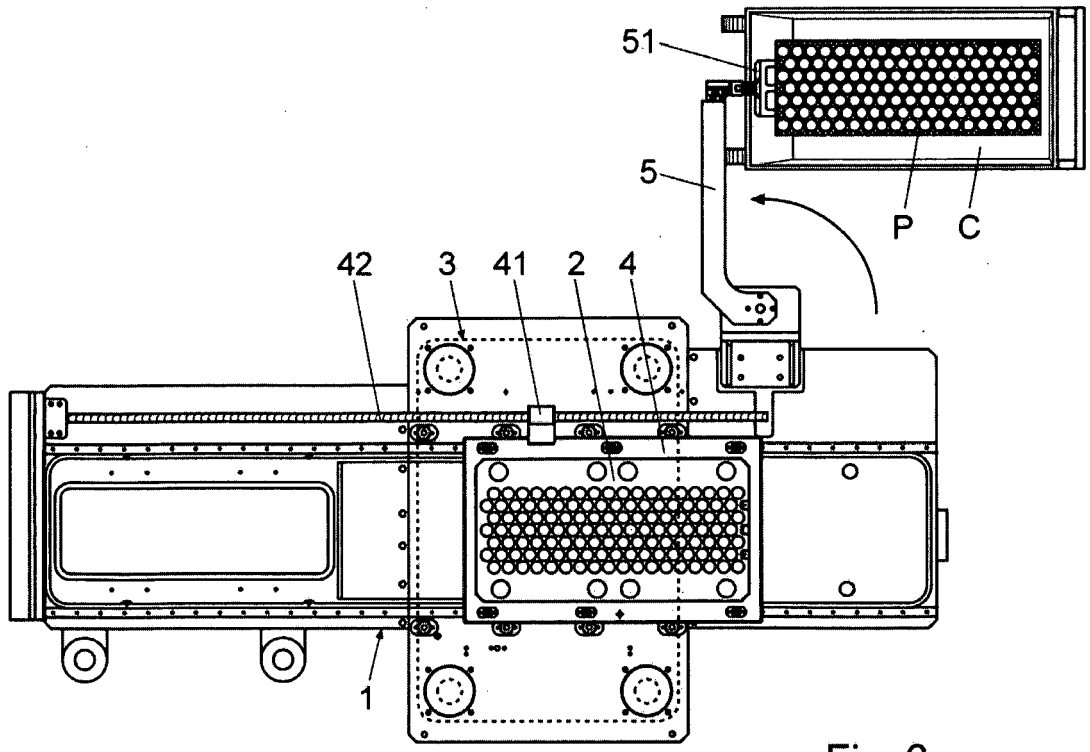

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 18 00 0913

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	CN 205 889 383 U (DONGGUAN CAN FOUND IND CO LTD) 18 January 2017 (2017-01-18) * abstract; figures * -----	1	INV. B26F1/02 B26D7/01 B26D7/18
A	WO 2018/145439 A1 (GUANGZHOU MINHUI AUTOMOBILE PARTS CO LTD [CN]) 16 August 2018 (2018-08-16) * abstract; figures * -----	1	B26F1/38
A	EP 1 914 050 A1 (HEIDELBERGER DRUCKMASCH AG [DE]) 23 April 2008 (2008-04-23) * abstract; 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	24 May 2019	Canelas, Rui

CATEGORY OF CITED DOCUMENTS

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24-05-2019

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