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(54) **ROTARY STAMPING DEVICE**

(57) Provided is a rotary stamping device. The rotary stamping device includes a sleeve structure (1), a stamping component (2), and a rotary component (3) with a reset function. One end of the stamping component (2) extends into the sleeve structure (1) and the stamping component (2) may slide along an axial direction of the sleeve structure (1). The rotary component (3) is rotatably disposed in the sleeve structure (1) and sleeved on the stamping component (2). The stamping component (2) drives the rotary component (3) to move upward when the stamping component (2) stamps a part (100). The rotary component (3) is configured to be reset after the stamping component (2) completes stamping, and the rotary component (3) can drive the stamping component (2) to rotate by a predetermined angle during a resetting process.

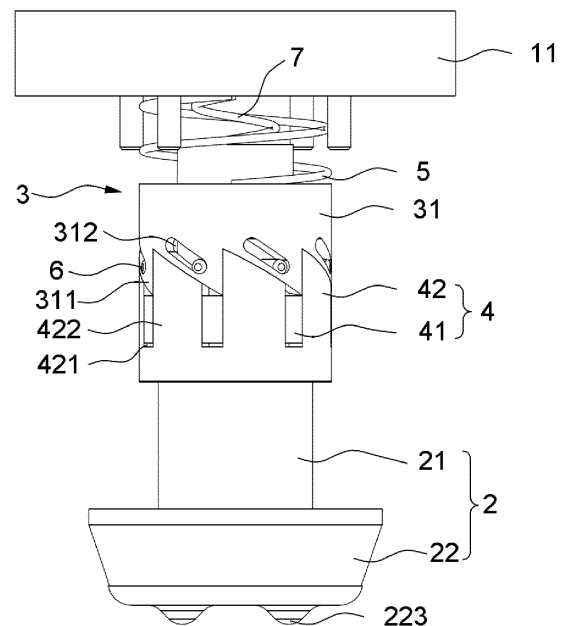


FIG. 2

Description

[0001] This application claims priority to Chinese Patent Application No. 201910241380.0 filed with the CNIPA on Mar. 28, 2019, the disclosure of which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present application relates to the technical field of stamping devices, for example, a rotary stamping device.

BACKGROUND

[0003] In the stamping and manufacturing process of sheet metal parts, planchet is usually obtained by cutting with various moulds. A blanking mould is mainly used for manufacturing a metal slab from the original material sheet, and in the subsequent stamping operation, a stamped part of the final desired shape is formed. The stamped part is usually stacked for storage after the stamping operation.

[0004] In daily production, when the stamped parts is stacked and stored, multiple identical stamped parts fit very tightly after being stacked together, and it is not easy to separate the stamped parts, which brings considerable difficulty to the later retrieval using guide slope. To solve such problems, the stamped part is designed with special treatments. For example, under the premise of not affecting the final use of the stamped parts, several local areas of the stamped parts produced successively are formed into different profiles. Several indents are usually pressed out at different positions on the stamped part, and the positions of the indents of two adjacent stamped parts are different so that the gap between the stamped parts can be increased for material retrieval during storage. To achieve the difference between the positions of the indents of the stamped parts, in the existing stamping mould, a driving device drives the ratchet to rotate so that the variations of the indents are achieved. Although this structure may achieve the variations of the indents, the overall cost of the stamping mould is relatively high due to the need for an additional driving mechanism for driving.

SUMMARY

[0005] The present application provides a rotary stamping device so that variations of positions of the stamped indents of two adjacent stamped parts can be achieved without an additional driving device, and thus the production cost is reduced. The present application provides a rotary stamping device.

[0006] The rotary stamping device includes a sleeve structure, a stamping component, a rotary component.

[0007] One end of the stamping component extends into the sleeve structure, and the stamping component

is configured to slide along an axial direction of the sleeve structure.

[0008] The rotary component has a reset function, where the rotary component is rotatably disposed in the sleeve structure and sleeved on the stamping component.

[0009] The stamping component is configured to drive the rotary component to move upward when the stamping component stamps a part; the rotary component is configured to be reset after the stamping component completes stamping, and the rotary component is configured to drive the stamping component to rotate by a predetermined angle during a resetting process.

[0010] In the rotary stamping device, when the stamping component stamps a part, the stamping component drives the rotary component to move upward. After the stamping component completes stamping, the rotary component is reset. Moreover, the rotary component may drive the stamping component to rotate during the resetting process, and then another part is stamped by the stamping component. When another part is stamped, a position where the another part is stamped is not the same as a position where the previous part is stamped due to the rotation of stamping component so that the distance between two adjacent parts is increased. The rotary stamping mechanism achieves mechanical transmission through the cooperation of a resetting element and the rotary component, and no driving mechanism is needed so that the cost is reduced.

[0011] The rotary component includes a rotary element, the rotary element is sleeved on the stamping component, and the rotary element is configured to drive the stamping component to rotate by the predetermined angle when the rotary element is reset. The resetting of the rotary element may drive the stamping component to rotate so that when different parts are stamped, the positions of indents are different, and thus the distance between two parts can be increased.

[0012] A guide component is further included. The guide component includes a guide rail structure and a guide member. The guide rail structure is sleeved on the stamping component and located below the rotary element. The guide member is sleeved on the guide rail structure and connected to the sleeve structure. The guide rail structure is configured to move along the guide member so that the guide member guides the rotary element to move and rotate.

[0013] Multiple guide rails are disposed on an outer surface of the guide rail structure, multiple guide grooves are disposed on a side wall of the guide member, and each guide rail is configured to move in a respective guide groove along an axial direction of the guide member. The movement and rotation of the rotary element may be driven by the movement of the guide rail in the guide groove.

[0014] A top surface of the guide member and a bottom surface of the rotary element are provided with guide slopes matching with each other. The guide member cooperates with the rotary element through the guide slopes

to guide the rotation of the rotary element.

[0015] First guide elements each are formed between two adjacent guide grooves, and one end of each of the first guide elements close to the rotary element is provided with a first guide slope; one end of the rotary element close to the guide member is provided with multiple second guide elements, and each second guide element is provided with a second guide slope configured to cooperate with a corresponding first guide slope; the first guide slope and the second guide slope are configured to cooperate so that a bottom end of the second guide element extends from one guide groove into another guide groove adjacent to the one guide groove.

[0016] When the rotary element moves upward to the highest position, a bottom end of the second guide slope is not lower than a top end of the first guide slope.

[0017] The maximum arc length of the plurality of second guide elements is equal to the sum of an arc length of the plurality of guide grooves and the maximum arc length of the first guide elements.

[0018] Multiple sliding grooves are obliquely disposed on the rotary element and each are parallel to a respective second guide slope, multiple transmission elements are disposed on a side wall of the stamping component, and each transmission element is configured to penetrate through a respective sliding groove and move along a length direction of the respective sliding groove. The sliding groove and the transmission element cooperate so that the rotary element can drive the stamping component to rotate.

[0019] A resetting element is further included, and the resetting element is disposed between the rotary component and the sleeve structure to reset the rotary component. The resetting element is provided so that the resetting element cooperates with a rotary component to reset the rotary component, mechanical transmission is achieved, no additional driving mechanism is needed, and thus the cost is reduced.

[0020] The stamping component includes a stamping spindle and a plunger tip component. One end of the stamping spindle extends into the sleeve structure, and the other end of the stamping spindle is connected to the plunger tip component. The stamping spindle includes a first spindle and a second spindle that are coaxially arranged. One end of the first spindle is connected to the second spindle, and the other end is connected to the plunger tip component. The diameter of the second spindle is less than the diameter of the first spindle. The guide rail structure is sleeved on the second spindle. The stamping spindle of this structure can drive the guide rail to move when the stamping spindle is moving.

[0021] The stamping component includes a connection portion, a cover plate, and multiple plunger tips. One end surface of the connection portion is connected to the stamping spindle, and the other end surface of the connection portion is provided with the multiple plunger tips. The cover plate is provided with multiple through holes that are in one-to-one correspondence with positions of

the multiple plunger tips such that each of the multiple plunger tips extends out of the cover plate through a respective through hole. The connection portion is connected to the stamping spindle, the multiple plunger tips may be mounted on the connection portion through the cover plate, and each plunger tip extends out of the cover plate so that the plunger tips stamp parts, and thus indents are formed.

[0022] A buffer is further included, and the buffer is disposed at a position between one end of the stamping component that extends into the sleeve structure, and the sleeve structure.

[0023] The end of the second spindle of the stamping component is provided with an accommodation groove, one end of the buffer extends into the accommodation groove, and the other end of the buffer abuts against a base of the sleeve structure. The sleeve structure includes a base and a sleeve. The sleeve is connected to the base. A stepped hole is disposed in the sleeve. The stamping component penetrates through the stepped hole. The stepped hole includes a first hole and a second hole. The diameter of the second hole is less than the diameter of the first hole. One end of the sleeve provided with the first hole is connected to the base. The guide rail structure is disposed in the first hole, and an outer diameter of the guide rail structure is greater than a diameter of the second hole.

[0024] In the rotary stamping mechanism provided in the present application, when the stamping component stamps a part, the stamping component drives the rotary component to move upward. After the stamping component completes stamping, the rotary component is reset. Moreover, the rotary component can drive the stamping component to rotate during the resetting process, and then the part is stamped by the stamping component. When another part is stamped, a position where the another part is stamped is not the same as a position where the previous part is stamped due to the rotation of the stamping component so that the distance between two adjacent parts is increased. The rotary component of the rotary stamping device may drive the stamping component to move during the resetting process so that mechanical transmission is achieved, and no driving mechanism is needed. Therefore, the cost is reduced.

BRIEF DESCRIPTION OF DRAWINGS

[0025]

FIG. 1 is a structural view of a rotary stamping device according to an embodiment of the present application;

FIG. 2 is a structural view of the rotary stamping device after a sleeve is removed according to an embodiment of the present application;

FIG. 3 is a front view of the rotary stamping device

according to an embodiment of the present application;

FIG. 4 is a sectional view taken along a line A-A of FIG. 3;

FIG. 5 is a structural view of a stamping component according to an embodiment of the present application;

FIG. 6 is a structural view of a plunger tip component of the stamping component according to an embodiment of the present application;

FIG. 7 is a structural view of a guide rail structure according to an embodiment of the present application;

FIG. 8 is a structural view of a guide member according to an embodiment of the present application;

FIG. 9 is a structural view of a rotary element according to an embodiment of the present application;

FIG. 10 is a sectional view of the rotary stamping device when the rotary stamping device is not stamping a part according to an embodiment of the present application;

FIG. 11 is a sectional view of the rotary stamping device when the plunger tip of the rotary stamping device contacts a part according to an embodiment of the present application;

FIG. 12 is a sectional view of the rotary stamping device when the plunger tip of the rotary stamping device leaves a part according to an embodiment of the present application;

FIG. 13 is a sectional view of the rotary stamping device when the guide rail of the rotary stamping device stops the rotary element according to an embodiment of the present application;

FIG. 14 is a sectional view of the rotary stamping device when the plunger tip of the rotary stamping device moves down along the guide rail to give way to the rotary element according to an embodiment of the present application; and

FIG. 15 is a sectional view of the rotary stamping device when the plunger tip of the rotary stamping device completes steering according to an embodiment of the present application.

Reference list

[0026]

	1	sleeve structure
	11	base
	12	sleeve
	1211	first hole
5	1212	second hole
	2	stamping component
	21	stamping spindle
	22	plunger tip component
	211	first spindle
10	212	second spindle
	221	connection portion
	222	cover plate
	223	plunger tip
	3	rotary component
15	31	rotary element
	311	second guide element
	3111	second guide slope
	312	sliding groove
	4	guide component
20	41	guide rail structure
	411	guide rail
	42	guide member
	421	guide groove
	422	first guide element
25	4221	first guide slope
	5	resetting element
	6	transmission element
	7	buffer
	100	part

30

DETAILED DESCRIPTION

[0027] Technical solutions of the present application are described in detail in conjunction with drawings and embodiments. In the description of the present invention, unless otherwise expressly specified and limited, the term "connected to each other", "connected", or "fixed" is to be construed in a broad sense, for example, as permanently connected, detachably connected, or integrated; mechanically connected or electrically connected; directly connected to each other or indirectly connected to each other via an intermediary; or internally connected or interactional between two components.

[0028] For those of ordinary skill in the art, specific meanings of the preceding terms in the present invention may be construed based on specific situations.

[0029] In the present invention, unless otherwise expressly specified and limited, when a first feature is described as "above" or "below" a second feature, the first feature and the second feature may be in direct contact or be in contact via another feature between the two features. Moreover, when the first feature is described as "on", "above", or "over" the second feature, the first feature is right on, above, or over the second feature or the first feature is obliquely on, above, or over the second feature, or the first feature is simply at a higher level than the second feature. When the first feature is described as "under", "below", or "underneath" the second feature,

the first feature is right under, below, or underneath the second feature or the first feature is obliquely under, below, or underneath the second feature, or the first feature is simply at a lower level than the second feature.

[0030] To solve the problem that multiple identical stamped parts fit very tightly after being stacked together, and it is not easy to separate them, which brings considerable difficulty to later retrieval, This embodiment provides a rotary stamping mechanism for stamping a part so that an indent is formed on the part, and the distance between two adjacent plates is increased, which is conducive to picking and placing the part. FIG. 1 is a structural view of a rotary stamping mechanism according to the present invention; FIG. 2 is a structural view of the rotary stamping mechanism after a sleeve is removed according to the present invention; and FIG. 3 is a front view of the rotary stamping device according to present invention.

[0031] As shown in FIGS. 1 to 3, this embodiment provides a rotary stamping device. The rotary stamping device includes a sleeve structure 1, a stamping component 2, and a rotary component 3 with a reset function. One end of the stamping component 2 extends into the sleeve structure 1, and the stamping component 2 is configured to slide along an axial direction of the sleeve structure 1. The rotary component 3 is rotatably disposed in the sleeve structure 1 and sleeved on the stamping component 2. When the stamping component 2 stamps a part 100, the stamping component 2 is configured to drive the rotary component 3 to move upward. After the stamping component 2 completes stamping, the rotary component 3 is reset, and the rotary component 3 is configured to drive the stamping component 2 to rotate by a predetermined angle during a resetting process.

[0032] The rotary stamping device stamps the part 100 through the stamping component 2. When another part 100 is stamped, a position where another part 100 is stamped is not the same as a position where the previous part is stamped due to the rotation of the stamping component 2 so that the distance between two adjacent parts 100 is increased. The rotary component 3 of the rotary stamping device may drive the stamping component 2 to move during the resetting process so that mechanical transmission is achieved, and no driving mechanism is needed. Therefore, the cost is reduced.

[0033] Specifically, the sleeve structure 1 includes a base 11 and a sleeve 12, and the sleeve 12 is connected to the base 11. In this embodiment, the sleeve 12 is connected to the base 11 through fastening bolts.

[0034] As shown in FIG. 4, a stepped hole is disposed in the sleeve 12, and the stamping component 2 penetrates through the stepped hole. In this embodiment, the stepped hole includes a first hole 1211 and a second hole 1212, the diameter of the second hole 1212 is less than the diameter of the first hole 1211, and one end of the sleeve 12 provided with the first hole 1211 is connected to the base 11.

[0035] FIG. 5 is a structural view of a stamping com-

ponent according to the present invention. As shown in FIG. 5, the stamping component 2 includes a stamping spindle 21 and a plunger tip component 22. One end of the stamping spindle 21 extends into the sleeve structure 1, and the other end is connected to the plunger tip component 22. In this embodiment, the stamping spindle 21 includes a first spindle 211 and a second spindle 212 that are coaxially arranged. One end of the first spindle 211 is connected to the second spindle 212, and the other end of the first spindle 211 is connected to the plunger tip component 22. The diameter of the second spindle 212 is less than the diameter of the first spindle 211.

[0036] FIG. 6 is a structural view of a plunger tip component of the stamping component according to the present invention. As shown in FIG. 6, the plunger tip component 22 includes a connection portion 221, a cover plate 222, and multiple plunger tips 223. One end surface of the connection portion 221 is connected to the stamping spindle 21, and the other end surface of the connection portion 221 is provided with the multiple plunger tips 223. The cover plate 222 is provided with multiple through holes that are in one-to-one correspondence with positions of the multiple plunger tips 223 such that each of the multiple plunger tips 223 extends out of the cover plate 222 through a respective through hole. The connection portion 221 is connected to the stamping spindle 21, the multiple plunger tips 223 may be mounted on the connection portion 221 through the cover plate 222, and each plunger tip 223 extends out of the cover plate 222 so that the plunger tips 223 stamp parts 100, and thus indents are formed. In this embodiment, two plunger tips 223 are disposed on the plunger tip component 22. In other embodiments, the specific number of plunger tips 223 is set according to requirements. In the plunger tip component 22, the plunger tips 223 are mounted on the connection portion 221 through the cover plate 222, and the plunger tip 223 may be disassembled so that the processing difficulty is reduced, the interchangeability of the plunger tips 223 is improved, the service life of the mechanism is prolonged, and the cost is greatly reduced.

[0037] As shown in FIGS. 2 and 9, the rotary component 3 includes a rotary element 31. The rotary element 31 is a ringlike structure. The rotary element 31 is sleeved on the stamping component 2. The rotary element 31 is configured to drive the stamping component 2 to rotate by a predetermined angle when the rotary element 31 is reset.

[0038] FIG. 7 is a structural view of a guide rail structure according to the present invention, and FIG. 8 is a structural view of a guide member according to the present invention. As shown in FIGS. 7 and 8, the rotary stamping device further includes a guide component 4. The guide component 4 includes a guide rail structure 41 and a guide member 42. The guide rail structure 41 is disposed in the first hole 1211 in the sleeve structure 1 and sleeved on the outside of the stamping component 2. The outer diameter of the guide rail structure 41 is greater than the inner diameter of the second hole 1212 so that the guide

rail structure 41 is prevented from detaching from the sleeve structure 1. The guide member 42 is sleeved on the guide rail structure 41 and connected to the sleeve structure 1, that is, the guide member 42 is fixed, the guide member 42 is disposed under the rotary element 31, and the guide rail structure 41 may move along the guide member 42 so that the guide member 42 guides the rotary element 31 to move and rotate around an central axis.

[0039] Specifically, the guide rail structure 41 includes a guide rail body and multiple guide rails 411 disposed on the guide rail body, multiple guide grooves 421 are disposed on the side wall of the guide member 42, and each guide rail 411 is configured to move in a respective guide groove 421 along an axial direction of the guide member 42. The movement of the stamping component 2 along the vertical direction drives the guide rail structure 41 to move along the guide grooves 421 so that the guide rail structure 41 abuts against the rotary element 31 and thus the rotary element 31 moves and rotates under the guidance of the guide member 42.

[0040] FIG. 8 is a structural view of a guide member according to the present invention. As shown in FIG. 8, in this embodiment, the multiple guide grooves 421 on the guide member 42 are arranged at equal intervals along the circumferential direction of the guide member 42 so that the angle by which the rotary element 31 rotates each time is consistent. The guide rail body is a ringlike structure. The multiple guide rails 411 are uniformly arranged along the circumferential direction of the guide rail body. One guide rail 411 is disposed in each guide groove 421.

[0041] To facilitate the guide member 42 to guide a guide element 31, a top surface of the guide member 42 and a bottom surface of the rotary element 31 are provided with guide slopes matching with each other. Specifically, first guide elements 422 each are formed between two adjacent guide grooves 421, and one end of each first guide element 422 close to the rotary element 31 is provided with a first guide slope 4221. Atop end of the guide groove 421 of the guide member 42 is an opening, and the opening may provide a guiding function for the movement of the rotary element 31 and the guide rail 411.

[0042] One end of the rotary element 31 close to the guide member 42 is provided with multiple second guide elements 311. Each second guide element 311 is provided with a second guide slope 3111 that cooperates with the first guide slope 4221. Each second guide element 311 cooperates with the second guide slope 3111 through the first guide slope 4221 so that a bottom end of the second guide element 311 extends from one guide groove 421 into another guide groove 421 adjacent to the one guide groove 421. The second guide elements 311 of the rotary element 31 are provided so that when the first guide slope 4221 cooperates with the second guide slope 3111, the bottom end of the second guide element 311 extends from one guide groove 421 into

another guide groove 421 adjacent to the one guide groove 421, and thus the rotary element 31 may rotate by a predetermined angle.

[0043] In this embodiment, the inclination directions of the first guide slope 4221 and the second guide slope 3111 are the same, and the gradients are the same. This arrangement facilitates the movement of the second guide slope 3111 along the first guide slope 4221, and the movement is more stable.

[0044] When the rotary element 31 moves upward to the highest position, a bottom end of the second guide slope 3111 is not lower than a top end of the first guide slope 4221. Preferably, when the rotary element 31 moves upward to the highest position, the bottom end of the second guide slope 3111 is located at the top end of the first guide slope 4221 so that the rotary element 31 rotates under the guidance of the first guide slope 4221.

[0045] Each first guide element 422 formed between two adjacent guide grooves 421 cooperates with a respective second guide element 311 so that each second guide element 311 of the rotary element 31 cooperates with a respective one of the multiple guide grooves 421. In this manner, the rotary element 31 can rotate continuously for many times, and the rotation stability is good. Specifically, according to the number of guide grooves 421 arranged at equal intervals on the guide member 42, the angle by which the stamping component 2 rotates each time may be obtained. The multiple guide grooves 421 are arranged at equal intervals so that the plunger tip component 22 rotates in a more stable and uniform manner. In this embodiment, seven guide grooves 421 are arranged at equal intervals on the guide member 42. After the stamping component 2 performs stamping once, the stamping component 2 rotates by 51.43° . In other embodiments, it is not limited to the preceding seven guide grooves 421, and other number of guide grooves 421 may also be provided. For example, 5, 6, or 8 guide grooves 421 may be provided. The specific number of guide grooves 421 can be set according to the angle by which the stamping component 2 needs to rotate.

[0046] The rotary element 31 of the rotary component 3 and the guide member 42 of the guide component 4 adopt a dividable structure so that the processing difficulty is reduced, and at the same time, the interchangeability of the components is improved, which facilitates the replacement of the guide member 42 or the rotary element 31 and reduces the cost.

[0047] The rotary stamping device in this example further includes a resetting element 5, and the resetting element 5 is disposed between the rotary component 3 and the sleeve structure 1 so that the stamping component 2 is reset along the axial direction of the sleeve structure 1. Preferably, the resetting element 5 is a spring.

[0048] FIG. 9 is a structural view of a rotary element according to the present invention. As shown in FIGS. 2, 4, and 9, the rotary element 31 is sleeved on the stamping component 2, one end of the rotary element 31 abuts

against the resetting element 5, and the other end cooperates with a guide slope 3121 so that the rotary element 31 rotates and drives the stamping component 2 to rotate. The rotary element 31 of the rotary component 3 cooperates with the first guide slope 4221 of the guide member 42 through the second guide slope 3111 so that the rotary element 31 rotates and drives the stamping component 2 to rotate. The resetting element 5 provides power for the steering of the rotary element 31 so that the plunger tip component 22 steers more smoothly, and at the same time, the resetting element 5 plays a role of limiting and buffering the rotary element 31.

[0049] To make the rotary element 31 drive the stamping component 2 to rotate, the rotary element 31 is further provided with multiple inclined sliding grooves 312 parallel to a respective second guide slope 3111, the second spindle 212 of the stamping component 2 is provided with transmission elements 6, and each transmission element 6 penetrates through a respective sliding groove 312 and moves along the length direction of the respective sliding groove 312. The sliding groove 312 and the transmission element 6 cooperate so that the rotary element 31 may drive the stamping component 2 to rotate. In this embodiment, the rotary element 31 is provided with multiple sliding grooves 312 along the circumferential direction, and the second spindle 212 is provided with multiple transmission elements 6 along the circumferential direction. Each sliding groove 312 is penetrated with one transmission element 6 so that the transmission element 6 is uniformly transmitted, and the stamping component 2 is uniformly stressed and rotates smoothly. When the rotary element 31 moves upward to the highest position, the bottom end of the second guide slope 3111 is located at the top end of the first guide slope 4221. In this case, the transmission element 6 is located at an upper end of the sliding groove 312. When the bottom end of the rotary element 31 rotates to a lowest end of another connected guide groove 421, the transmission element 6 is located at a lower end of the sliding groove 312.

[0050] In this embodiment, the maximum arc length of the second guide elements 311 is equal to the sum of the arc length of the guide grooves 421 and the maximum arc length of the first guide elements 422. This arrangement enables the second guide elements 311 to cooperate with the first guide elements 422 compactly.

[0051] As shown in FIGS. 2 and 4, the rotary stamping device further includes a buffer 7, and the buffer 7 is disposed between one end of the stamping component 2 that extends into the sleeve structure 1, and the sleeve structure 1. The buffer 7 may buffer the stamping component 2 so that the stamping component 2 can be prevented from directly abutting against the sleeve structure 1 and causing damage to the sleeve structure 1. Preferably, the buffer 7 is a spring.

[0052] In this embodiment, the end of the second spindle 212 of the stamping component 2 is provided with an accommodation groove, and one end of the buffer 7 extends into the accommodation groove, which facilitates

the installation and fixation of the buffer 7; the other end of the buffer 7 abuts against a base 11 of the sleeve structure 1 so that the impact load caused by the stamping spindle 21 to the base 11 can be reduced, and thus the service life of the mechanism can be improved.

[0053] The resetting element 5 of the rotary stamping device is provided. When the stamping component 2 stamps the part 100, the stamping component 2 moves along the axial direction of the sleeve structure 1 and compresses the resetting element 5; when the stamping component 2 completes stamping, the stamping component 2 moves along a direction opposite to the axial direction of the sleeve structure 1, the resetting element 5 abuts against the rotary component 3 so that the rotary component 3 drives the stamping component 2 to rotate, and then stamping component 2 stamps the part 100. When another part 100 is stamped, a position where another part 100 is stamped is not the same as a position where the previous part is stamped due to the rotation of the rotary component 3 so that the distance between two adjacent parts 100 is increased. Through the cooperation of the resetting element 5 and the rotary component 3, the rotary stamping device achieves mechanical transmission and no driving mechanism is needed so that the cost is reduced.

[0054] Working status of the rotary stamping device is described below.

1. FIG. 10 is a sectional view of the rotary stamping device when the rotary stamping device is not stamping a part according to the present invention. As shown in FIG. 10, in the natural state of the stamping component 2 (when the part 100 is not stamped), the plunger tip 223 is in an initial static state under the weight of the plunger tip 223, and the resetting element 5 and the buffer 7 are both in a no-load natural state (alternatively in a compressed state).

2. FIG. 11 is a sectional view of the rotary stamping device when the plunger tip of the rotary stamping device contacts a part according to the present invention. As shown in FIG. 11, when the stamping component 2 stamps the part 100, the rotary stamping device presses the part 100 downward, the plunger tip 223 contacts the part 100, the plunger tip 223 moves upward to drive the guide rail structure 41 to move upward so that the buffer 7 is compressed, the stamping spindle 21 contacts the base 11 of the sleeve structure 1, the entire plunger tip 223 drives the rotary element 31 to move upward to the highest position, and the resetting element 5 and the buffer 7 are in the maximum state of compression.

3. FIG. 12 is a sectional view of the rotary stamping device when the plunger tip of the rotary stamping device leaves a part according to the present invention. As shown in FIG. 12, the plunger tip 223 is in a

compacted state, the rotary element 31, guided by the transmission element 6 and the sliding groove 312, slides along the guide member 42 under the action of the resetting element 5, the rotational offset of the rotary element 31 is the stroke of the sliding groove 312, and the position of the plunger tip 233 remains unchanged.

4. FIG. 13 is a sectional view of the rotary stamping device when the guide rail of the rotary stamping device stops the rotary element according to the present invention. As shown in FIG. 13, after stamping is completed, the rotary stamping component 2 moves upward as a whole and begins to separate from the part 100, and the rotary element 31, under the resetting action of the resetting element 5, drives the transmission element 6 and the plunger tip 233 to conduct initial rotation to a position where the rotary element 31 abuts against the guide rail 411.

5. FIG. 14 is a sectional view of the rotary stamping device when the plunger tip of the rotary stamping device moves down along the guide rail to give way to the rotary element according to the present invention. As shown in FIG. 14, the plunger tip 233 completely separates from the part 100, and the plunger tip 223, under the weight of the plunger tip 223 and the action of the buffer 7, drives the transmission element 6 to move downward; the transmission element 6 moves to the lower end of the sliding groove 312 of the rotary element 31, and in this case, the rotary element 31 may rotate.

6. FIG. 15 is a sectional view of the rotary stamping device when the plunger tip of the rotary stamping device completes steering according to the present invention. As shown in FIG. 15, the plunger tip 223 continues to move downward, the transmission element 6 drives the second guide element 311 of the rotary element 31 to rotate and extend into the adjacent guide groove 421, the plunger tip 223 is driven to rotate, and steering is completed.

[0055] Through the stamping of the stamping component 2, the part 100 is stamped so that an indent is formed. When the rotary stamping device is lifted, the stamping component 2 may rotate by a certain angle. When the part 100 is stamped by the stamping component 2 again, the position of the indent stamped by the plunger tip 223 is not the same as the position of the indent during the previous stamping, and the distance between two adjacent parts 100 is increased.

[0056] In the description of the present invention, it is to be understood that the orientation or position relationships indicated by terms "above", "below", "right" and the like are based on the orientation or position relationships shown in the drawings, merely for facilitating description and simplifying operation, and these relationships do not

indicate or imply that the referred device or element has a specific orientation and is constructed and operated in a specific orientation, and thus it is not to be construed as limiting the present invention. In addition, the terms "first" and "second" are used only to distinguish between descriptions and have no special meaning.

[0057] In the description of the specification, the description of reference terms "an embodiment" or "example" means that specific characteristics, structures, materials, or features described in connection with the embodiment or example are included in at least one embodiment or example of the present invention. In the specification, the illustrative description of the preceding terms does not necessarily refer to the same embodiment or example.

Claims

1. A rotary stamping device, comprising:
 - a sleeve structure (1);
 - a stamping component (2), wherein one end of the stamping component (2) extends into the sleeve structure (1), and the stamping component (2) is configured to slide along an axial direction of the sleeve structure (1); and
 - a rotary component (3) with a reset function, wherein the rotary component (3) is rotatably disposed in the sleeve structure (1) and sleeved on the stamping component (2), wherein the stamping component (2) is configured to drive the rotary component (3) to move upward when the stamping component (2) stamps a part (100); the rotary component (3) is configured to be reset after the stamping component (2) completes stamping, and the rotary component (3) is configured to drive the stamping component (2) to rotate by a predetermined angle during a resetting process.
2. The rotary stamping device of claim 1, wherein the rotary component (3) comprises a rotary element (31), the rotary element (31) is sleeved on the stamping component (2), and the rotary element (31) is configured to drive the stamping component (2) to rotate by the predetermined angle when the rotary element (31) is reset.
3. The rotary stamping device of claim 2, further comprising a guide component (4), wherein the guide component (4) comprises a guide rail structure (41) and a guide member (42), the guide rail structure (41) is sleeved on the stamping component (2) and located below the rotary element (31), the guide member (42) is sleeved on the guide rail structure (41) and connected to the sleeve structure (1), and the guide rail structure (41) is configured to move

along the guide member (42) so that the guide member (42) guides the rotary element (31) to move and rotate.

4. The rotary stamping device of claim 3, wherein a plurality of guide rails (411) are disposed on an outer surface of the guide rail structure (41), and a plurality of guide grooves (421) are disposed on a side wall of the guide member (42), each of the plurality of guide rails (411) is configured to move in a respective one of the plurality of guide grooves (421) along an axial direction of the guide member (42). 5
5. The rotary stamping device of claim 4, wherein a top surface of the guide member (42) and a bottom surface of the rotary element (31) are provided with guide slopes matching with each other. 10
6. The rotary stamping device of claim 5, wherein first guide elements (422) each are formed between two adjacent ones of the plurality of guide grooves (421), and one end of each of the first guide elements (422) close to the rotary element (31) is provided with a first guide slope (4221); one end of the rotary element (31) close to the guide member (42) is provided with a plurality of second guide elements (311), and each of the plurality of second guide elements (311) is provided with a second guide slope (3111) configured to cooperate with a corresponding first guide slope (4221); the first guide slope (4221) and the second guide slope (3111) are configured to cooperate so that a bottom end of the second guide element (311) is configured to extend from one of the plurality of guide grooves (421) into another one of the plurality of guide grooves (421) adjacent to the one of the plurality of guide grooves (421). 20 25 30 35
7. The rotary stamping device of claim 6, wherein when the rotary element (31) moves upward to a highest position, a bottom end of the second guide slope (3111) is not lower than a top end of the first guide slope (4221). 40
8. The rotary stamping device of claims 6 or 7, wherein a maximum arc length of the plurality of second guide elements (311) is equal to a sum of an arc length of the plurality of guide grooves (421) and a maximum arc length of the first guide elements (422). 45
9. The rotary stamping device of any one of claims 6 to 8, wherein a plurality of sliding grooves (312) are obliquely disposed on the rotary element (31) and each are parallel to a respective second guide slope (3111), a plurality of transmission elements (6) are disposed on a side wall of the stamping component (2), and each of the plurality of transmission elements (6) is configured to penetrate through a respective one of the plurality of sliding grooves (312) 50 55

and move along a length direction of the respective one of the plurality of sliding grooves (312).

10. The rotary stamping device of any one of claims 1 to 9, further comprising a resetting element (5), wherein the resetting element (5) is disposed between the rotary component (3) and the sleeve structure (1) and is configured to reset the rotary component (3). 5
11. The rotary stamping device of claim 10, wherein the stamping component (2) comprises a stamping spindle (21) and a plunger tip component (22), one end of the stamping spindle (21) extends into the sleeve structure (1), the other end of the stamping spindle (21) is connected to the plunger tip component (22), the stamping spindle (21) comprises a first spindle (211) and a second spindle (212) that are coaxially arranged, one end of the first spindle (211) is connected to the second spindle (212), the other end of the first spindle (211) is connected to the plunger tip component (22), a diameter of the second spindle (212) is less than a diameter of the first spindle (211), and the guide rail structure (41) is sleeved on the second spindle (212). 10 15 20 25 30 35
12. The rotary stamping device of claim 11, wherein the plunger tip component (22) comprises a connection portion (221), a cover plate (222), and a plurality of plunger tips (223), one end surface of the connection portion (221) is connected to the stamping spindle (21), the other end surface of the connection portion (221) is provided with the plurality of plunger tips (223), and the cover plate (222) is provided with a plurality of through holes that are in one-to-one correspondence with positions of the plurality of plunger tips (223) such that each of the plurality of plunger tips (223) extends out of the cover plate (222) through a respective one of the plurality of through holes. 40
13. The rotary stamping device of any one of claims 1 to 12, further comprising a buffer (7), wherein the buffer (7) is disposed between the one end of the stamping component (2) that extends into the sleeve structure (1), and the sleeve structure (1). 45
14. The rotary stamping device of claim 13, wherein an end of the second spindle (212) of the stamping component (2) is provided with an accommodation groove, one end of the buffer (7) extends into the accommodation groove, and the other end of the buffer (7) abuts against a base (11) of the sleeve structure (1). 50 55
15. The rotary stamping device of any one of claims 3 to 14, wherein the sleeve structure (1) comprises a base (11) and a sleeve (12), the sleeve (12) is con-

nected to the base (11), a stepped hole is disposed in the sleeve (12), the stamping component (2) penetrates through the stepped hole, the stepped hole comprises a first hole (1211) and a second hole (1212), a diameter of the second hole (1212) is less than a diameter of the first hole (1211), one end of the sleeve (12) provided with the first hole (1211) is connected to the base (11), a guide rail structure (41) is disposed in the first hole (1211), and an outer diameter of the guide rail structure (41) is greater than a diameter of the second hole (1212).

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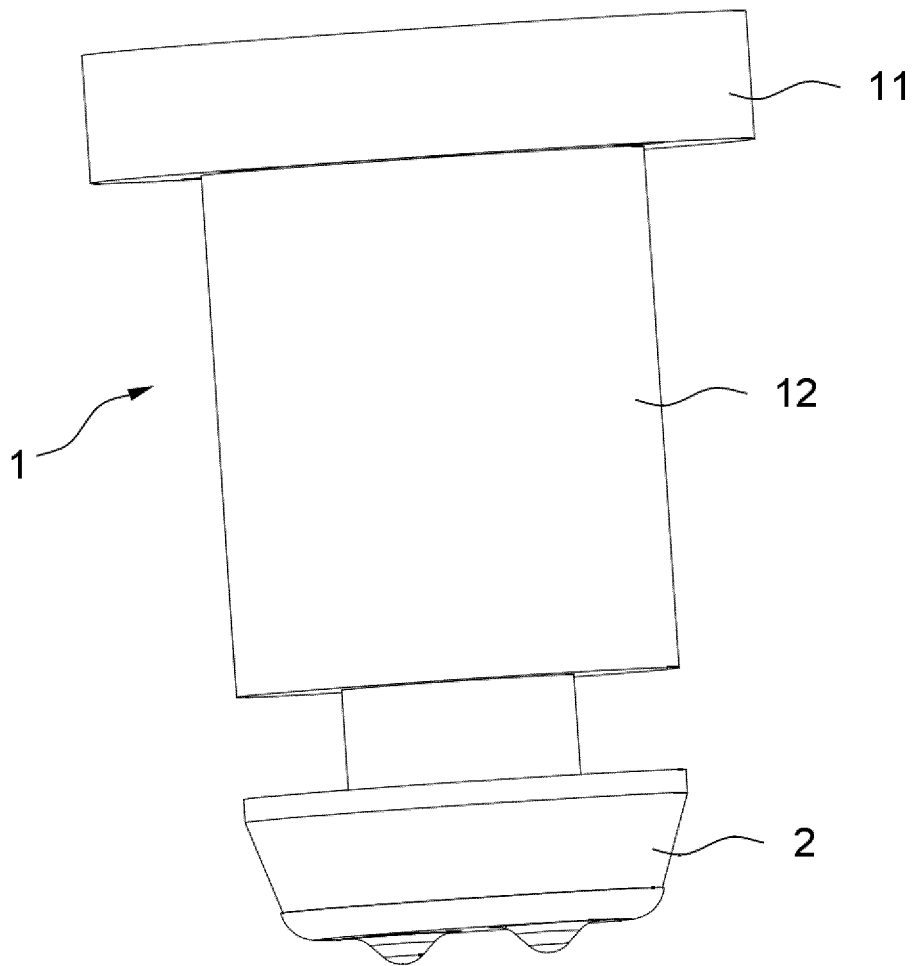


FIG. 1

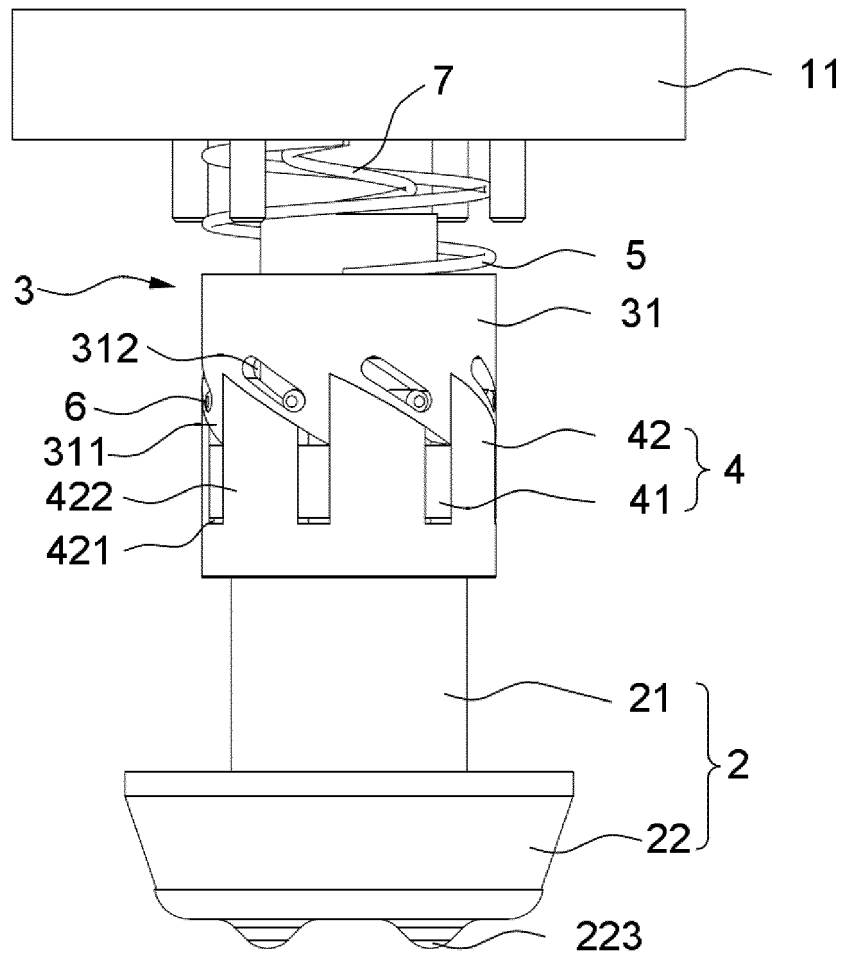


FIG. 2

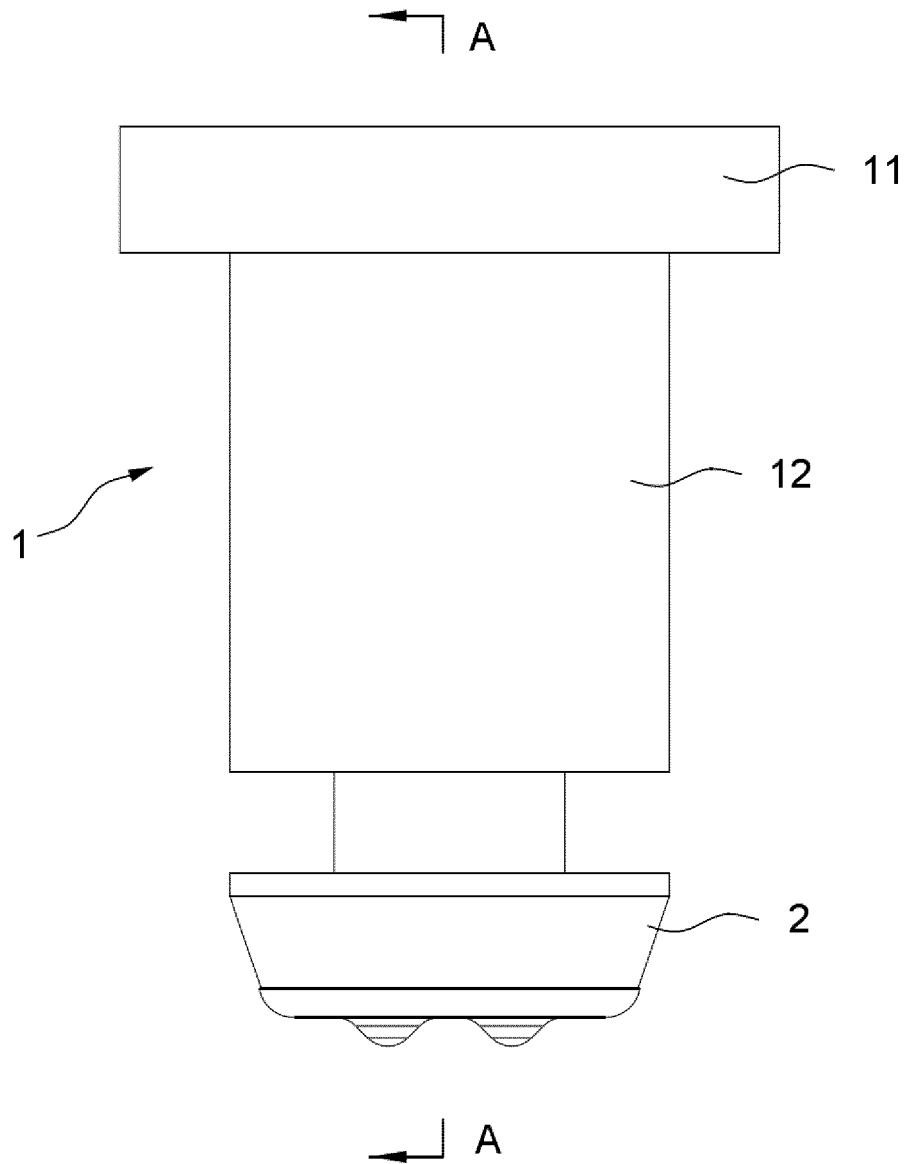


FIG. 3

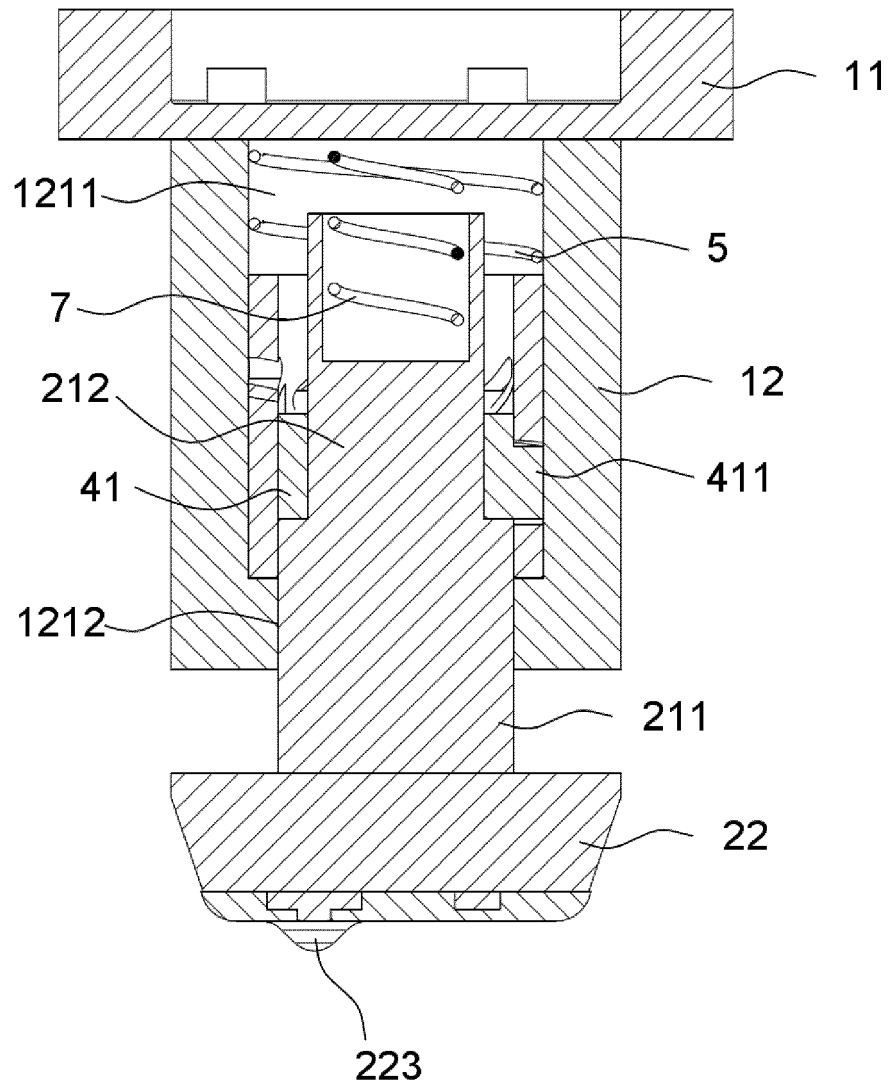


FIG. 4

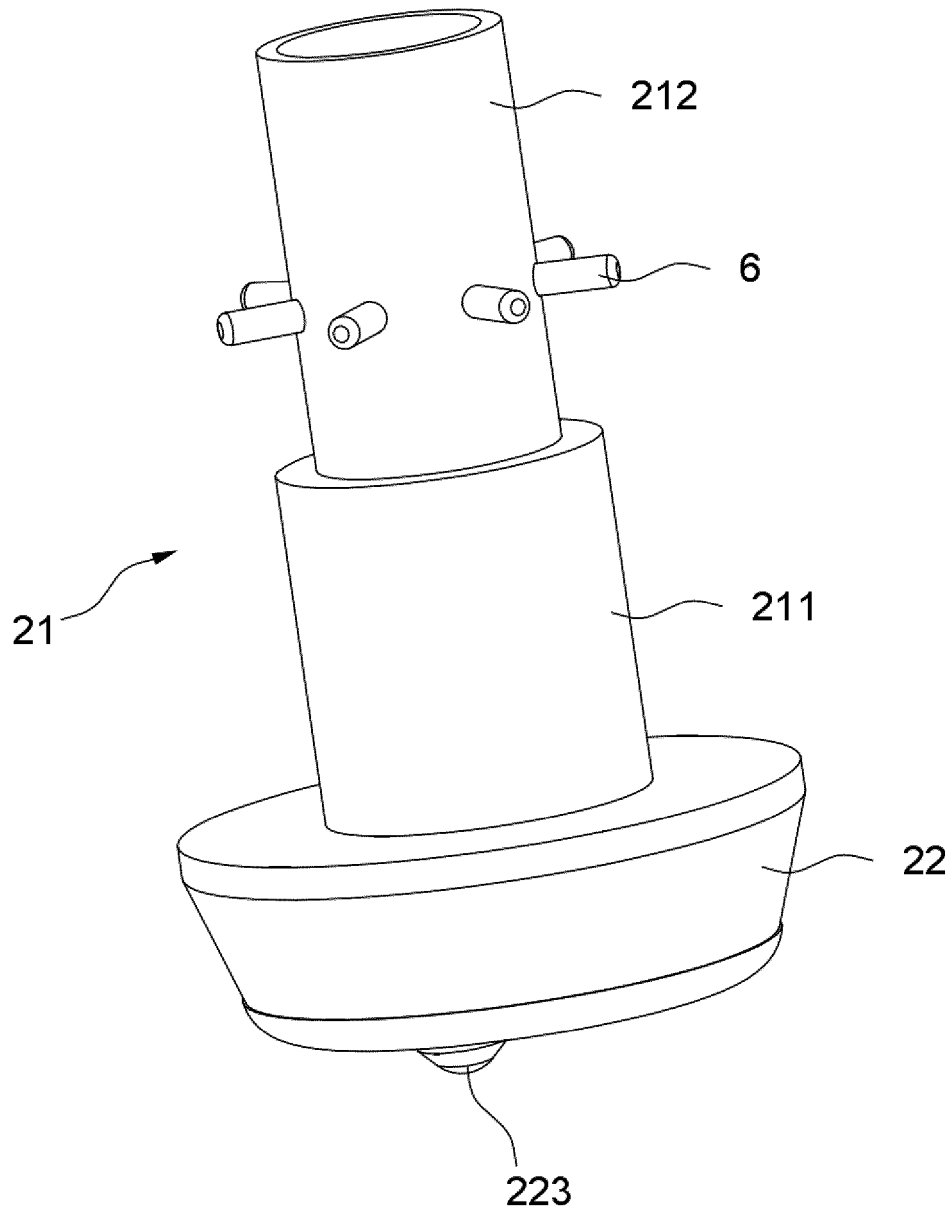


FIG. 5

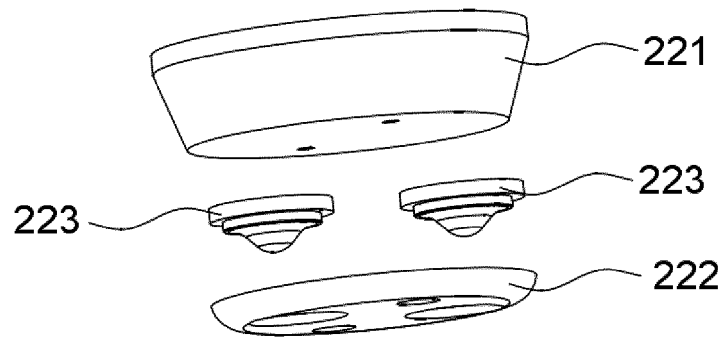


FIG. 6

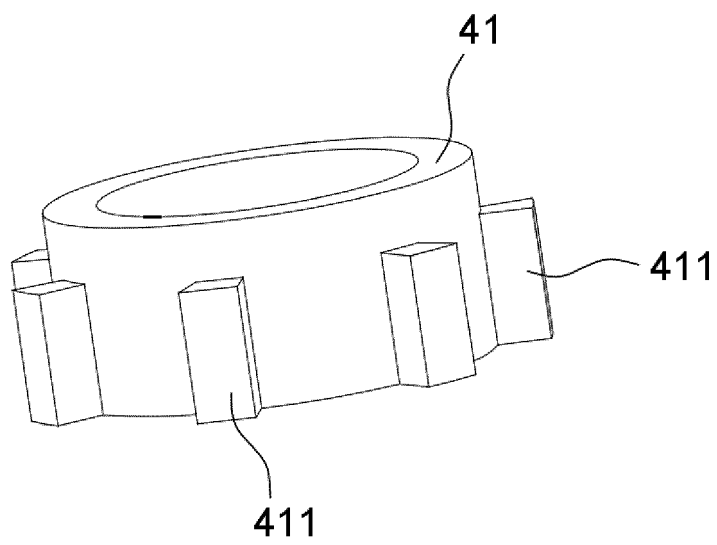


FIG. 7

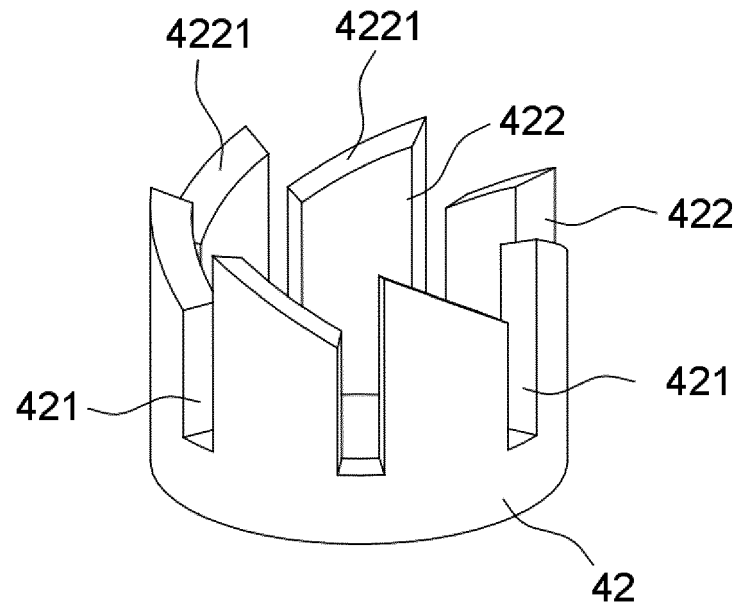


FIG. 8

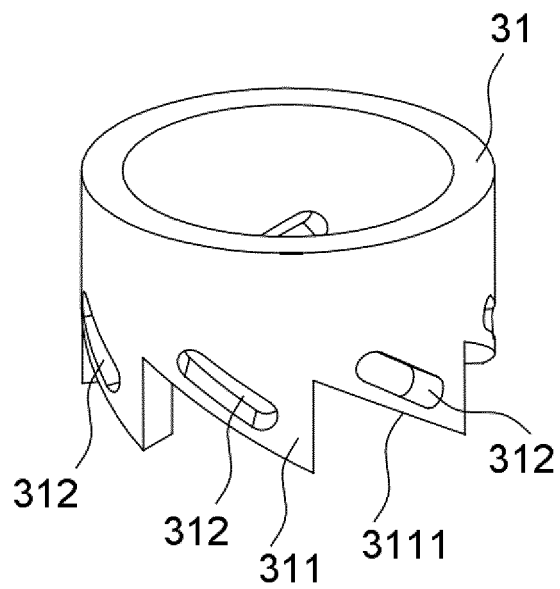


FIG. 9

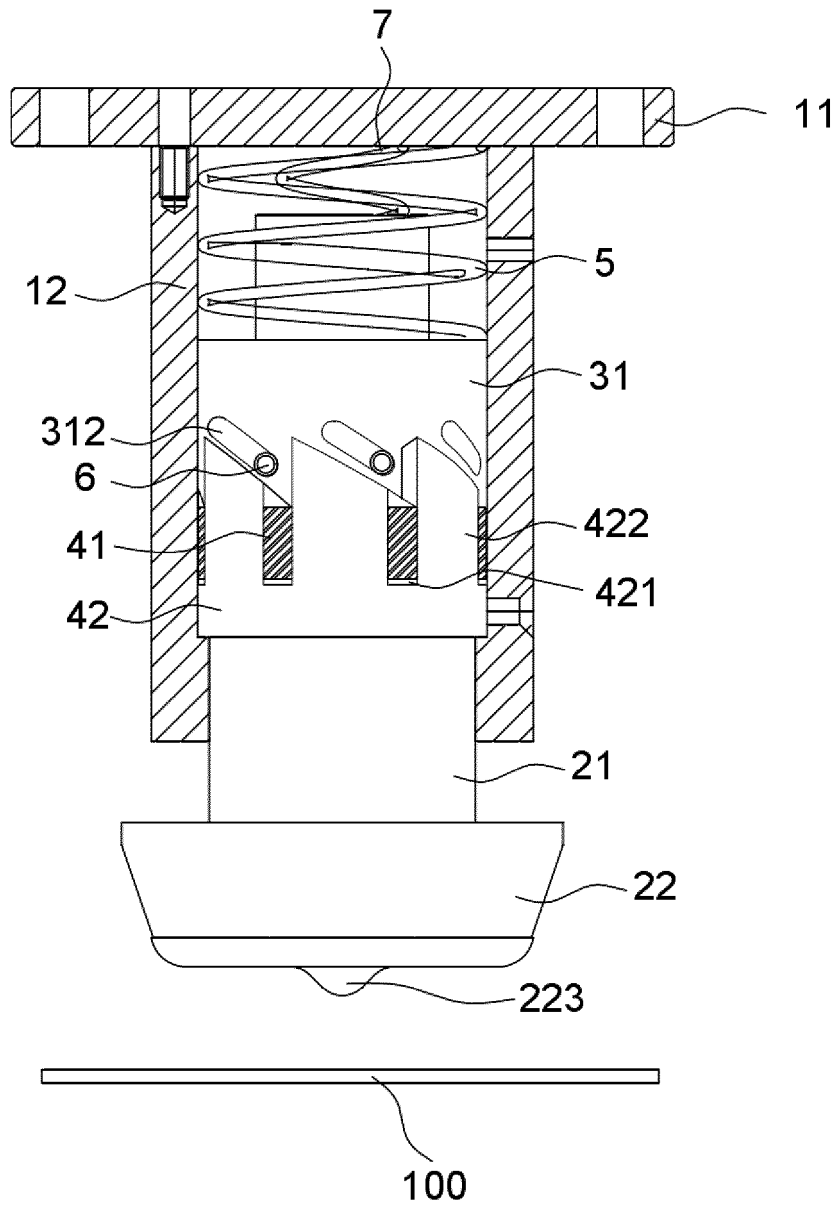


FIG. 10

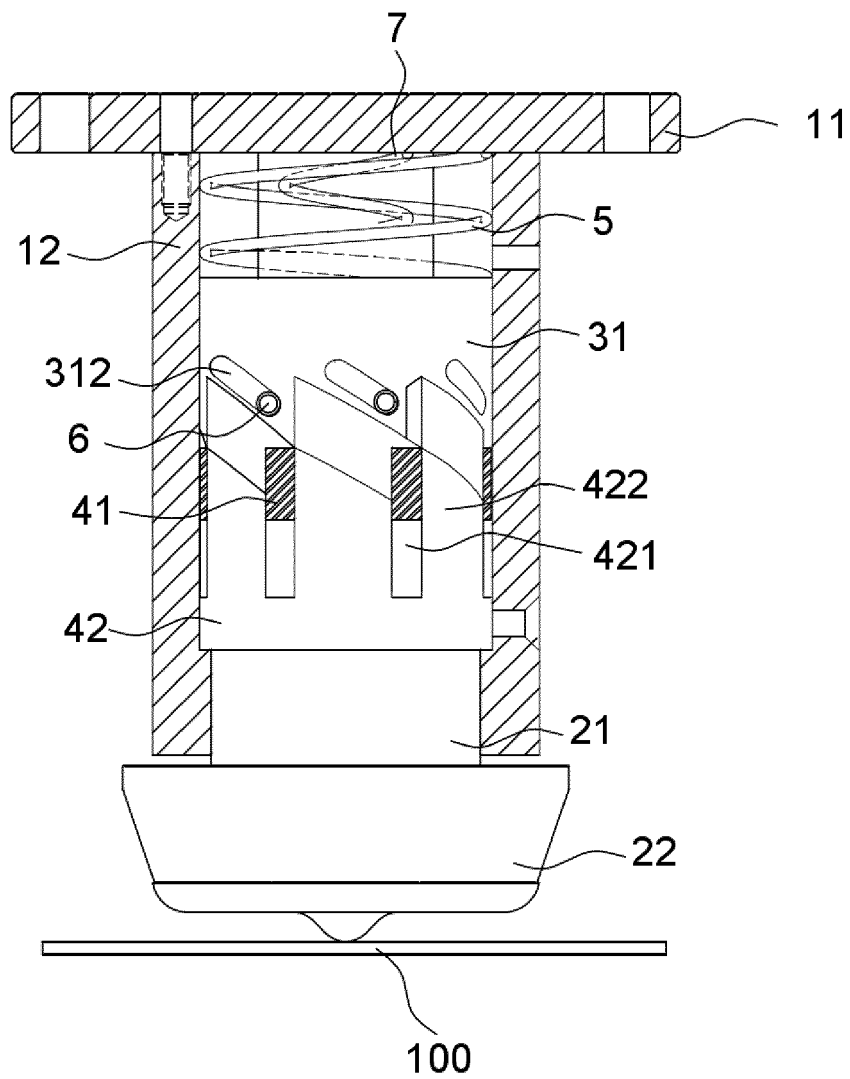


FIG. 11

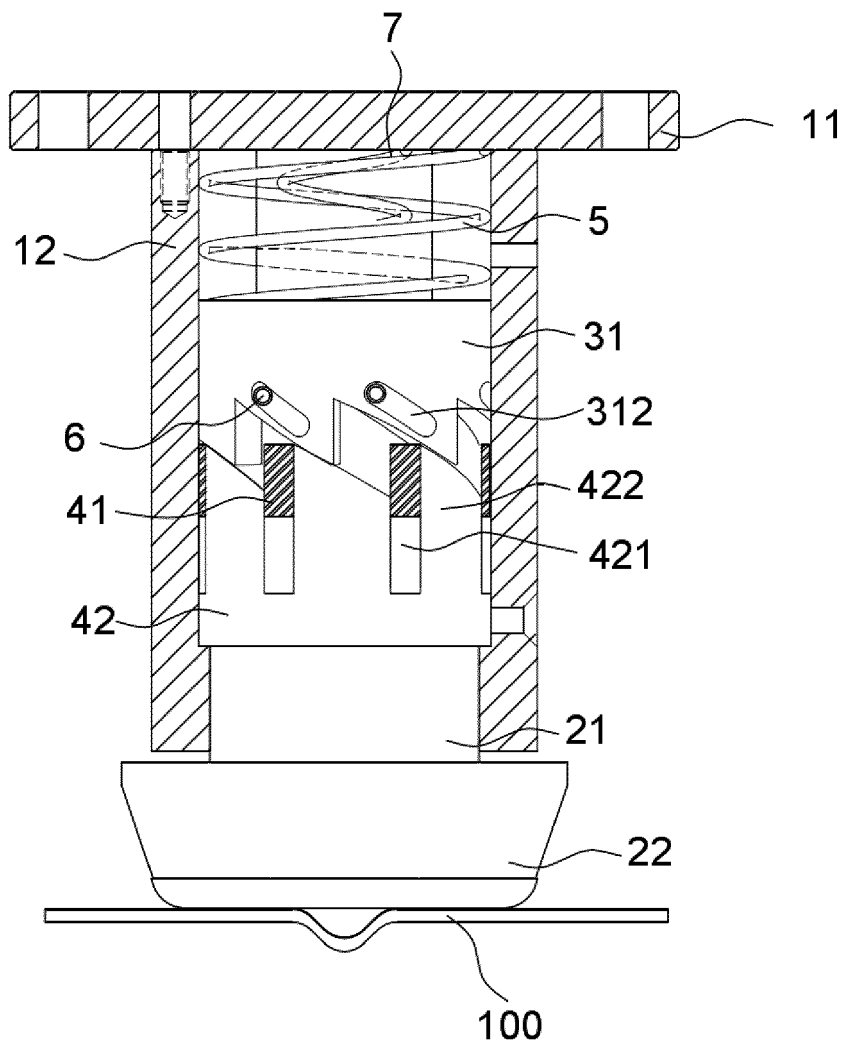


FIG. 12

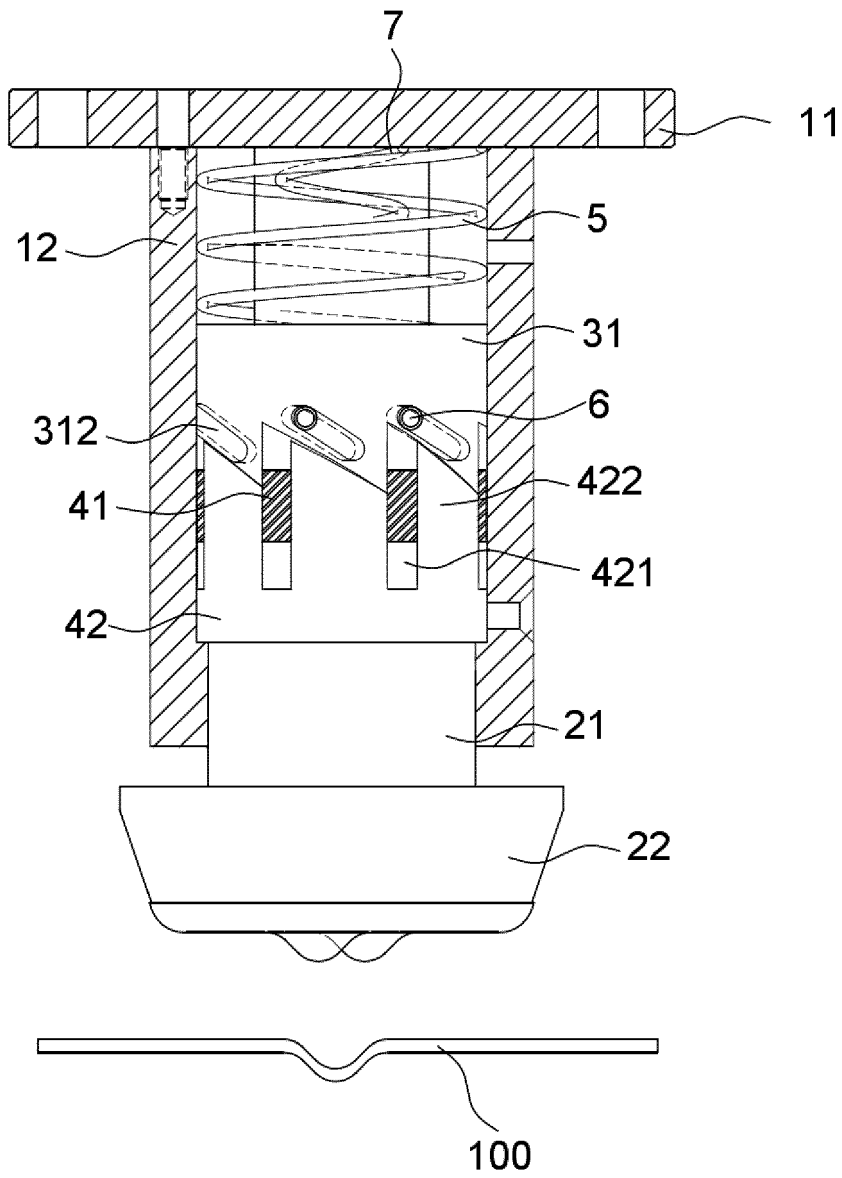


FIG. 13

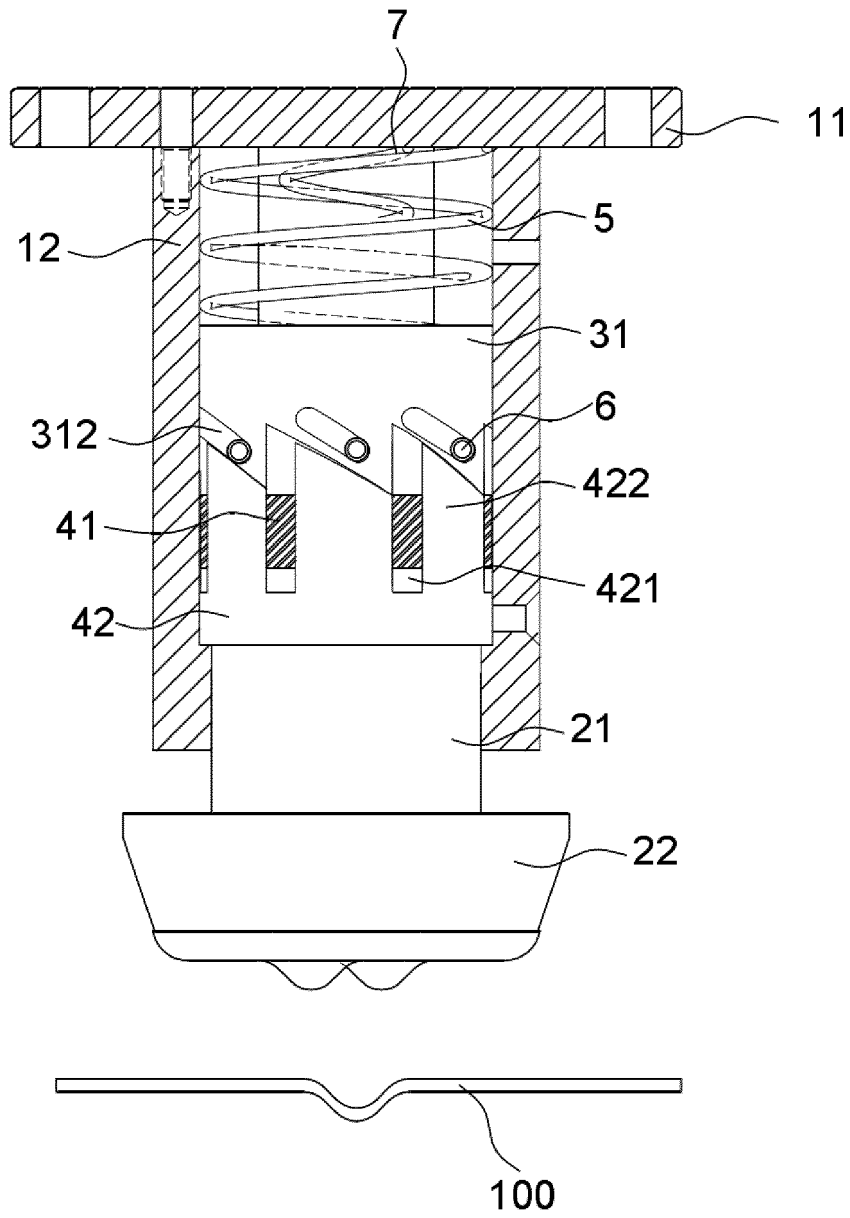


FIG. 14

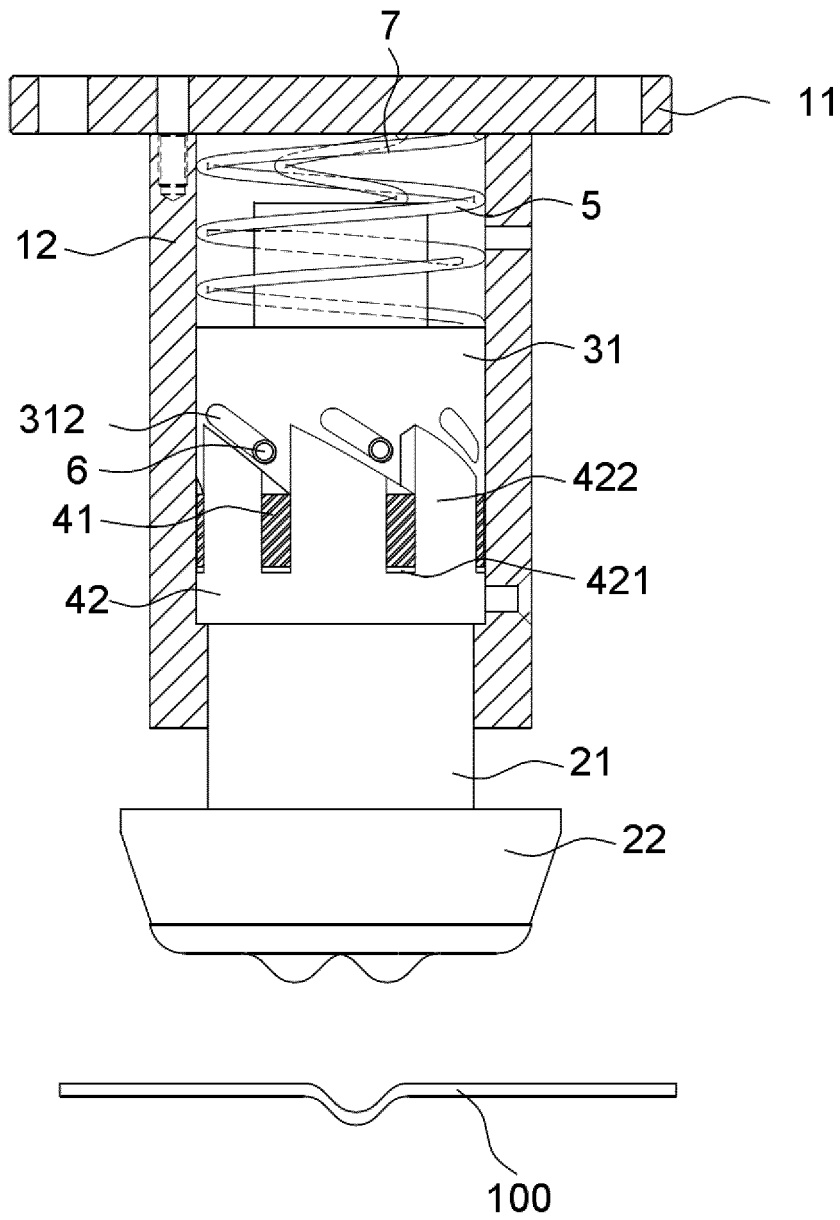


FIG. 15

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/113544

A. CLASSIFICATION OF SUBJECT MATTER

B21D 22/04(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B21D22/-, B21D37/-,

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT, WPI, EPODOC, CNKI: 优德精密, 杨加华, 李显, 崔履芦, 刘国辉, 吕二旦, 何祥提, 旋转, 转动, 冲压, 冲窝, 套筒, 轴, 转向, 冲头, 导向, 槽, 斜面, 复位, 弹簧, rotat+, punch+, dimpler, press, sleeve, shaft, guid+, adjust+, channel, groove, bevel, reset, spring

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 109848300 A (JOUDEER PRECISION INDUSTRY (KUNSHAN) CO., LTD.) 07 June 2019 (2019-06-07) description, paragraphs [0050]-[0079], and figures 1-15	1-15
E	CN 209716199 U (JOUDEER PRECISION INDUSTRY (KUNSHAN) CO., LTD.) 03 December 2019 (2019-12-03) description, paragraphs [0050]-[0079], and figures 1-15	1-15
X	US 2016082497 A1 (WELKER ENGINEERED PRODUCTS COMPANY) 24 March 2016 (2016-03-24) description, paragraphs [34]-[0061], and figures 1-26	1-2, 10
A	CN 208146709 U (SHANGHANG COUNTY MINZHOUTE INDUSTRIAL PRODUCTS DESIGN SERVICES CO., LTD.) 27 November 2018 (2018-11-27) entire document	1-15
A	CN 102989963 A (LANZHOU LS HEAVY MACHINERY CO., LTD.) 27 March 2013 (2013-03-27) entire document	1-15

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:	"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

07 January 2020

Date of mailing of the international search report

31 January 2020

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Facsimile No. (86-10)62019451

Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/113544**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2019/113544

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CN 208146709 U	27 November 2018	None	
CN 102989963 A	27 March 2013	None	
CN 86208026 U	09 December 1987	None	
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Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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