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(54) TOOL FOR RIVETING NUTS

(57) The present invention discloses a gecko gun, which includes a housing (100) with a left handle (1) on the bottom, and a right handle (2). The mentioned left handle (1) and right handle (2) are all covered by a handle housing (3, 4). The mentioned cover housing (100) is installed with a U-shaped seat (5) at the top end. The top end of the right handle (2) is rotated with the top end of the housing (100) through a spindle (6). The top end of the right handle (2) is installed with a link mechanism (7), which is covered by the mentioned housing (100) and fixed to the housing (100) via screws. The link mechanism (7) includes a first linkage assembly (7) linked to the top end of the right handle (2) and a second linkage assembly (72) connected to the first linkage assembly (71), and the second linkage assembly (72) is used to drive the U-shaped seat (5) to shift forward and backward. Thereby the designed gecko gun will help achieve the effect of energy saving.

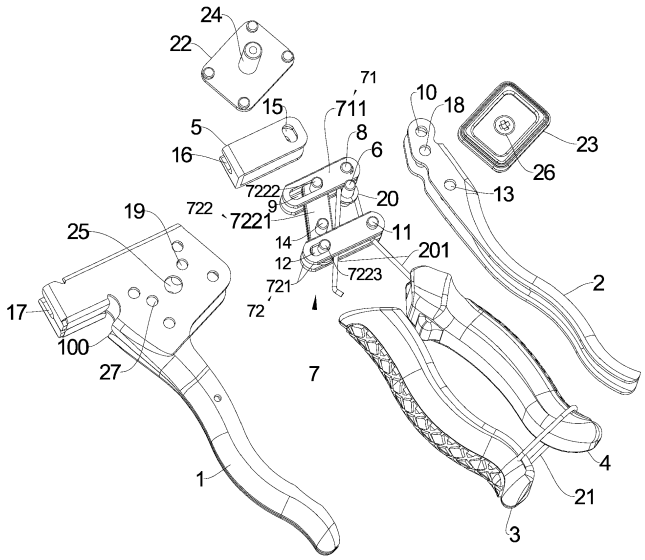

Fig. 4

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Description

[0001] The present invention relates to the technical field of riveting tools, specifically a gecko gun.

[0002] Gecko gun is a tool for riveting nuts, which can rivet nuts on the plate and is of a wide use. The existing gecko gun is usually structured with a housing, a left handle at the end of the housing, a right handle, a right connecting rod at the top end of the right handle, a chute on the connecting rod, a slide pin in the chute, a U-shaped seat mounted on the top end of the housing, a recess on the outer wall of U-shaped seat to lock the gecko peg. The core of the gecko peg will be locked to the U-shaped seat and the part comes out the housing will be locked to the place that needs to be riveted. Hold the right handle and the left handle to make them close up, then the connecting rod and the U-shaped seat will be pulled backward, and the U-shaped seat will drive the core of the gecko peg to move backward, thus making the gecko peg be fixed.

[0003] The gecko gun supported by technology mentioned above may help achieve the riveting of gecko pegs, but the following problems still exist in the course of use: due to the unreasonable design of the arm of force of the gecko gun, it will take great effort for people to open or close the handles, and for people who are not strong, they even need to use the gun with both hands. Therefore, this kind of gecko gun is time-consuming and energy-consuming, and it needs to be further improved.

[0004] In view of the deficiencies of the existing gecko gun, present invention is aimed to provide an effortless gecko gun.

[0005] Technical solution of the present invention is as follows: the gecko gun includes a housing with a left handle on the bottom, and a right handle. The mentioned left handle and right handle are all covered by a handle housing. The mentioned cover housing is installed with a U-shaped seat at the top end. The top end of the right handle is rotated with the top end of the housing through a spindle. The top end of the right handle is installed with a link mechanism, which is covered by the mentioned housing and fixed to the housing via screws. The link mechanism includes a first linkage assembly linked to the top end of the right handle and a second linkage assembly connected to the first linkage assembly, and the second linkage assembly is used to drive the U-shaped seat to shift forward and backward.

[0006] Furthermore, the mentioned first link assembly comprises two paralleled first link rods with the same shape and size. One end of the first link rods is fixed to the top end of the right handle. The mentioned second link assembly comprises two second link rods which are fixed to the top end of the right handle by one end and below the first link rods, and a connecting rod assembly installed on one end of the second link rods to drive the U-shaped seat to shift forward and backward.

[0007] The mentioned two first link rods are installed with a first pin on one end, and a long chute on the other end. The top end of the right handle is provided with a first pin hole for the first pin to be inserted by upper and lower ends. The mentioned two second link rods are installed with a second pin on one end, and a short chute on the other end. The top end of the right handle is provided with a second pin hole for the second pin to be inserted by upper and lower ends. The connecting rod assembly comprises two connecting rods, and the first concave boss and second concave boss fixed to two ends of the connecting rods. The mentioned first concave boss will go through the long chute and slide with the long chute. The mentioned second concave boss will go through the short chute and slide with the short chute. The connecting rod is provided with a positioning axis, the top and bottom ends of which are fixed to the top end of the housing.

[0008] The distance between the mentioned positioning axis and the first concave boss shall be longer than the distance between the positioning axis and the second concave boss.

[0009] The mentioned U-shaped seat is provided with a punching hole on the inner end, and the upper and lower ends of the first concave boss shall be fixed via the punching hole. The U-shaped seat is provided with a positioning slot on the other end.

[0010] The mentioned housing is provided with a neck on one side of the top end corresponding to the positioning slot.

[0011] The top end of the right handle is further provided with a third pin hole, and the mentioned first pin hole, third pin hole and second pin hole are set from top to bottom. The mentioned spindle is set through the third pin hole. The top end of the housing is provided with a positioning hole for the upper and lower ends of the spindle to be locked into. The spindle is covered by a torsion spring. The torsion spring has two bifurcations, wherein one of the bifurcation abuts against the second pin and its lower end locks into the left handle; the other bifurcation abuts the connecting rod, and its lower end locks into the right handle.

[0012] The distance between the mentioned first pin hole and the third pin hole is shorter than the distance between the second pin hole and third pin hole.

[0013] The top end of the left handle is provided with a hook, and one end of the hook locks on the outer wall of the right handle.

[0014] The mentioned housing is provided with a long cover plate and short cover plate on two sides of the top end. The long cover plate has a cylinder with threaded hole. The housing is provided with a through hole on the top end for the cylinder to go through. The cylinder goes through the through hole and then will be fixed to the short cover plate by a fastening screw.

[0015] For the presented gecko gun, when the right handle is folded, the first linkage assembly will give a backward force to the U-shaped seat; and then when the U-shaped seat goes forward, the second linkage assembly will also give U-shaped seat a backward force. The

same principle follows when the right handle is opened, with a difference only in the direction of the force. Therefore, the two forces will help to save the energy, so as to make the right handle easily be opened or folded.

Figure 1 is the overall structure diagram of the present invention;

Figure 2 is a cross-sectional schematic diagram of the present invention;

Figure 3 is the schematic diagram of the present invention when the housing,

long cover plate and short cover plate are removed;

Figure 4 is an exploded schematic view of the invention;

Figure 5 is the schematic diagram of the using state of link mechanism;

Figure 6 is a reference diagram of another using state of link mechanism

[0016] As shown from Figure 1 to Figure 6, the gecko gun includes a housing 100 with a left handle 1 on the bottom and a right handle 2. The left handle 1 and right handle 2 are all covered by a handle housing 3 and 4. The housing 100 is installed with a U-shaped seat 5 at the top end. The top end of the right handle 2 is rotated with the top end of the housing 100 through a spindle 6. The top end of the right handle 2 is installed with a link mechanism 7, which is covered by the housing 100 and fixed to the housing 100 via screws. The link mechanism 7 includes a first linkage assembly 71 linked to the top end of the right handle 2 and a second linkage assembly 72 connected to the first linkage assembly 71, and the second linkage assembly 72 is used to drive the U-shaped seat 5 to shift forward and backward.

[0017] The first link assembly 71 comprises two paralleled first link rods 711 with the same shape and size. One end of the first link rod 711 is fixed to the top end of the right handle 2. The second link assembly 72 comprises two second link rods 721 which are fixed to the top end of the right handle 2 by one end and below the first link rods 711, and a connecting rod assembly 722 installed on one end of the second links 721 to drive the U-shaped seat 5 to shift forward and backward. The two first link rods 711 are installed with a first pin 8 on one end, and a long chute 9 on the other end. The top end of the right handle 2 is provided with a first pin hole 10 for the first pin 8 to be inserted by upper and lower ends. The two second link rods 721 are installed with a second pin 11 on one end, and a short chute 12 on the other end. The top end of the right handle 2 is provided with a second pin hole 13 for the second pin 11 to be inserted by upper and lower ends. The connecting rod assembly 722 comprises two connecting rods 7221, and the first concave boss 7222 and second concave boss 7223 fixed to two ends of the connecting rod 7221. The mentioned first concave boss 7222 will go through the long chute 9 and slide with the long chute 9. The second concave boss 7223 will go through the short chute 12 and slide with the short chute 12. The connecting rod 7221 is provided with a positioning axis 14, the top and bottom ends of which 14 are fixed to the top end of the housing 100. On the top end of the housing 100, there is a fixing hole 27 for the fixation of the positioning axis 14.

[0018] The distance between the positioning axis 14 and the first concave boss 7222 is longer than the distance between the positioning axis 14 and the second concave boss 7223. When the connecting rod moves, since the position of the positioning axis 14 and the housing 100 will not change when fixed, there will be an arm of force between the positioning axis 14 and the first concave boss 7222, while another arm of force will also be formed between the positioning axis 14 and the second concave boss 7223. Since the short chute 12 is much shorter than the long chute, the distance between the positioning axis 14 and the first concave boss 7222 is two times longer than the distance between the positioning axis 14 and the second concave boss 7223.

[0019] In order to facilitate the connection between the U-shaped seat 5 and the first concave boss 7222, a punching hole is installed on the inner side of the U-shaped seat 5. The upper and lower ends of first concave boss 7222 are fixed in the punching hole 15, and a positioning slot 16 is provided on the other end of the U-shaped base 5. The housing 100 is provided with a neck 17 on one side of the top end corresponding to the positioning slot 16. When installing the gecko peg, lock the inner end of the peg in the neck 17, and the core of the peg will be locked in the positioning slot 16. When riveting gecko peg, pull the core of the peg through the U-shaped seat 5, so as to rivet the peg exposed outside of the housing 100.

[0020] The top end of the right handle 2 is further provided with a third pin hole 18, and the first pin hole 10, third pin hole 18 and second pin hole 13 are set from top to bottom. The spindle 6 is set through the third pin hole 18. The top end of the housing 100 is provided with a positioning hole 19 for the upper and lower ends of the spindle 6 to be locked into. The spindle 6 is covered by a torsion spring 20. The torsion spring 20 has two bifurcations 201, wherein one of the bifurcation 201 abuts against the second pin 11 and its 201 lower end locks into the left handle 1; the other bifurcation 201 abuts the connecting rod 7221, and its 201 lower end locks into the right handle 2. The distance between the first pin hole 10 and the third pin hole 18 is shorter than the distance between the second pin hole 13 and the third pin hole 18, so there will be an arm of force formed between the first pin 8 and the spindle 6 and an arm of force formed between the second pin and spindle 6. In order to make it most energy-saving when pulling or pressing right handle

2, the distance between the second pin 11 and the spindle 6 shall be two times longer than that between the first pin 8 and the spindle 6 at least.

[0021] The top end of the left handle housing 3 is provided with a hook 21, and one end of the hook 21 locks on the outer wall of the right handle 2. The set of the torsion spring 20 will facilitate the opening of right handle 2. In order to close up two handles, right handle 2 and left handle 1, people can only cover the outer wall of the right handle 2 with the hook 21.

[0022] In order to achieve a stable fixation of the housing 100 and the connecting rod assembly, housing 100 is provided with a long cover plate 22 and short cover plate 23 on two sides of the top end. The long cover plate 22 has a cylinder 24 with threaded hole. The housing 100 is provided with a through hole 25 on the top end for the cylinder 24 to go through. The cylinder 24 goes through the through hole 25 and then will be fixed to the short cover plate 23 by a fastening screw 26.

[0023] As shown in Figure 5 and Figure 6, Figure 5 is the schematic diagram of the folding state of link mechanism, and Figure 6 is a diagram of the opening state of link mechanism. When using, open the right handle 2 first and it will drive the first link rod 711 to move forward, while the second link rod will be driven to move backward, thus the U-shape seat will be driven to move forward. At first, the first concave boss 7222 stays at the end of the long chute 9, and when the second concave boss 7233 is slid to the front end of the short chute 12, the connecting rod 7221 interferes. Since the second concave boss 7233 is always pulled backward by the second link rod 721 the end of the connecting rod 7221 which is equipped with the second concave boss 7233 will move backward, while the other end of the connecting rod will move forward, thus making the first concave boss 7222 drive U-shaped seat 5 to move forward. Therefore, there will be 2 driving forces when U-shaped seat 5 moves, and the opening of right handle 2 is energy-saving. Finally, the first concave boss 7222 will be led to the front end of the long chute 9 by the connecting rods 7222.

[0024] Similarly, when riveting gecko peg, hold left handle 1 and right handle 2. Press right handle 2 tightly. Firstly, the right handle 2 will drive the first link rod to move backward and the second link rod to move forward, thus the U-shaped seat 5 will be driven to move backward. At first, the first concave boss 7222 stays at the end of the long chute 9, and when the second concave boss 7233 is slid to the front end of the short chute 12, the connecting rod 7221 interferes. Since the second concave boss 7233 is always pushed forward by the second link rod 721, the end of the connecting rod 7221 which is equipped with the second concave boss 7233 will move forward, while the other end of the connecting rod 7221 will move backward, thus making the first concave boss 7222 drive U-shaped seat 5 to move backward. Therefore, there will be 2 driving forces when U-shaped seat 5 moves, and the closing of right handle is energy-saving.

Reference numbers:

[0025]

1	left handle
2	right handle
3	left handle housing
4	right handle housing
5	U-shaped seat
6	spindle
7	link mechanism
8	first pin
9	long chute
10	first pin hole
11	second pin
12	short chute
13	second pin hole
14	positioning axis
15	punching hole
16	positioning slot
17	locking slot
18	third pin hole
19	positioning hole
20	torsion spring
21	hook
22	long cover plate
23	short cover plate
24	cylinder
25	through hole
26	fastening screws
27	fixing hole
71	first linkage assembly
72	second linkage assembly
100	housing
201	bifurcation
711	first link rod
721	second link rod
722	connecting rod assembly
7221	connecting rod
7222	first concave boss
7223	second concave boss

Claims

1. A gecko gun includes a housing (100) with a left handle (1) on the bottom and a right handle (2). The mentioned left handle (1) and right handle (2) are all covered by a handle housing (3) and (4). The mentioned cover housing (100) is installed with a U-shaped seat (5) at the top end. The top end of the right handle (2) is rotated with the top end of the housing (100) through a spindle (6). The features lie in: the top end of the right handle (2) is installed with a link mechanism (7), which is covered by the mentioned housing (100) and fixed to the housing (100) via screws. The link mechanism (7) includes a first linkage assembly (71) linked to the top end of the

right handle (2) and a second linkage assembly (72) connected to the first linkage assembly (71), and the second linkage assembly (72) is used to drive the U-shaped seat (5) to shift forward and backward.

2. The gecko gun of claim 1includes the following features: the mentioned first linkage assembly (71) comprises two paralleled first link rods (711) with the same shape and size. One end of the first link rod (711) is fixed to the top end of the right handle (2). The mentioned second linkage assembly (72) comprises two second link rods (721) which are fixed to the top end of the right handle (2) by one end and below the first link rods (711), and a connecting rod assembly (722) installed on one end of the second link rods (721) to drive the U-shaped seat (5) to shift forward and backward.

3. The gecko gun of claim 2 has the following features: the mentioned two first link rods (711) are installed with a first pin (8) on one end, and a long chute (9) on the other end. The top end of the right handle (2) is provided with a first pin hole (10) for the first pin (8) to be inserted by upper and lower ends. The mentioned two second link rods (721) are installed with a second pin (11) on one end, and a short chute (12) on the other end. The top end of the right handle (2) is provided with a second pin hole (13) for the second pin (11) to be inserted by upper and lower ends.
The connecting rod assembly (722) comprises two connecting rods (7221), and the first concave boss (7222) and second concave boss (7223) fixed to two ends of the connecting rods (7221). The mentioned first concave boss (7222) will go through the long chute (9) and slide with the long chute (9). The mentioned second concave boss (7223) will go through the short chute (12) and slide with the short chute (12). The connecting rod (7221) is provided with a positioning axis (14), the top and bottom ends of which (14) are fixed to the top end of the housing (100).

4. The gecko gun of claim 3 has the following features: The distance between the mentioned positioning axis (14) and the first concave boss (7222) shall be longer than the distance between the positioning axis (14) and the second concave boss (7223).

5. The gecko gun of claim 3 or 4 has the following features: The mentioned U-shaped seat (5) is provided with a punching hole (15) on the inner end, and the upper and lower ends of the first concave boss (7222) shall be fixed via the punching hole (15). The U-shaped seat (5) is provided with a positioning slot (16) on the other end.

6. The gecko gun of claim 5 has the following features: The mentioned housing (100) is provided with a neck (17) on one side of the top end corresponding to the positioning slot (16).

7. The gecko gun of one of the claims 3 to 6 has the following features: The top end of the right handle (2) is further provided with a third pin hole (18), and the mentioned first pin hole (10), third pin hole (18) and second pin hole (13) are set from top to bottom. The mentioned spindle (6) is set through the third pin hole (18). The top end of the housing (100) is provided with a positioning hole (19) for the upper and lower ends of the spindle (6) to be locked into. The spindle (6) is covered by a torsion spring (20). The torsion spring (20) has two bifurcations (201), wherein one of the bifurcation (201) abuts against the second pin (11) and its (201) lower end locks into the left handle (1); the other bifurcation (201) abuts the connecting rod (7221), and its (201) lower end locks into the right handle (2).

8. The gecko gun of claim 7 has the following features: The distance between the mentioned first pin hole (10) and the third pin hole (18) is shorter than the distance between the second pin hole (13) and third pin hole (18).

9. The gecko gun of one of the previous claims has the following features: The top end of the left handle housing (3) is provided with a hook (21), and one end of the hook (21) locks on the outer wall of the right handle (2).

10. The gecko gun of one of the previous claims has the following features: The mentioned housing (100) is provided with a long cover plate (22) and short cover plate (23) on two sides of the top end. The long cover plate (22) has a cylinder (24) with threaded hole. The housing (100) is provided with a through hole (25) on the top end for the cylinder (24) to go through. The cylinder (24) goes through the through hole (25) and then will be fixed to the short cover plate (23) by a fastening screw (26).

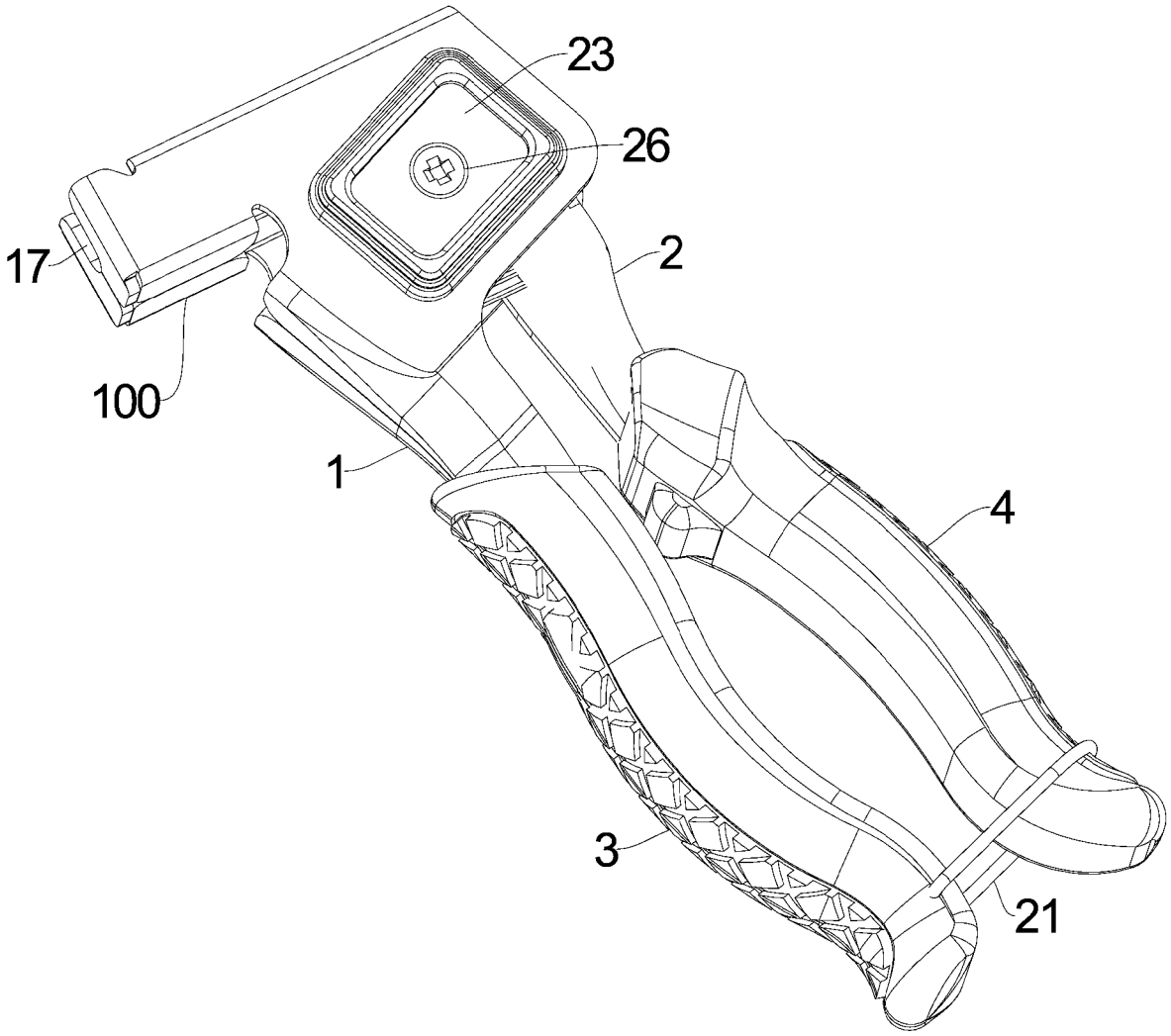

Fig. 1

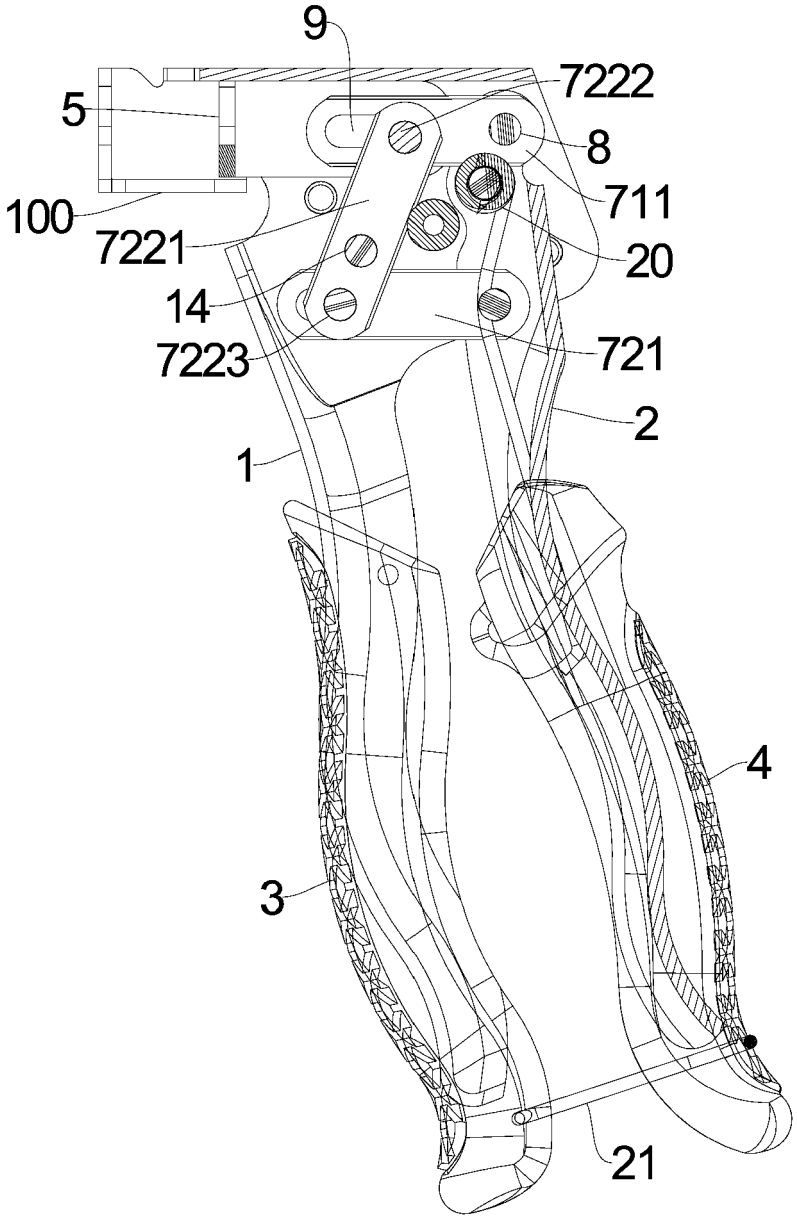

Fig.2

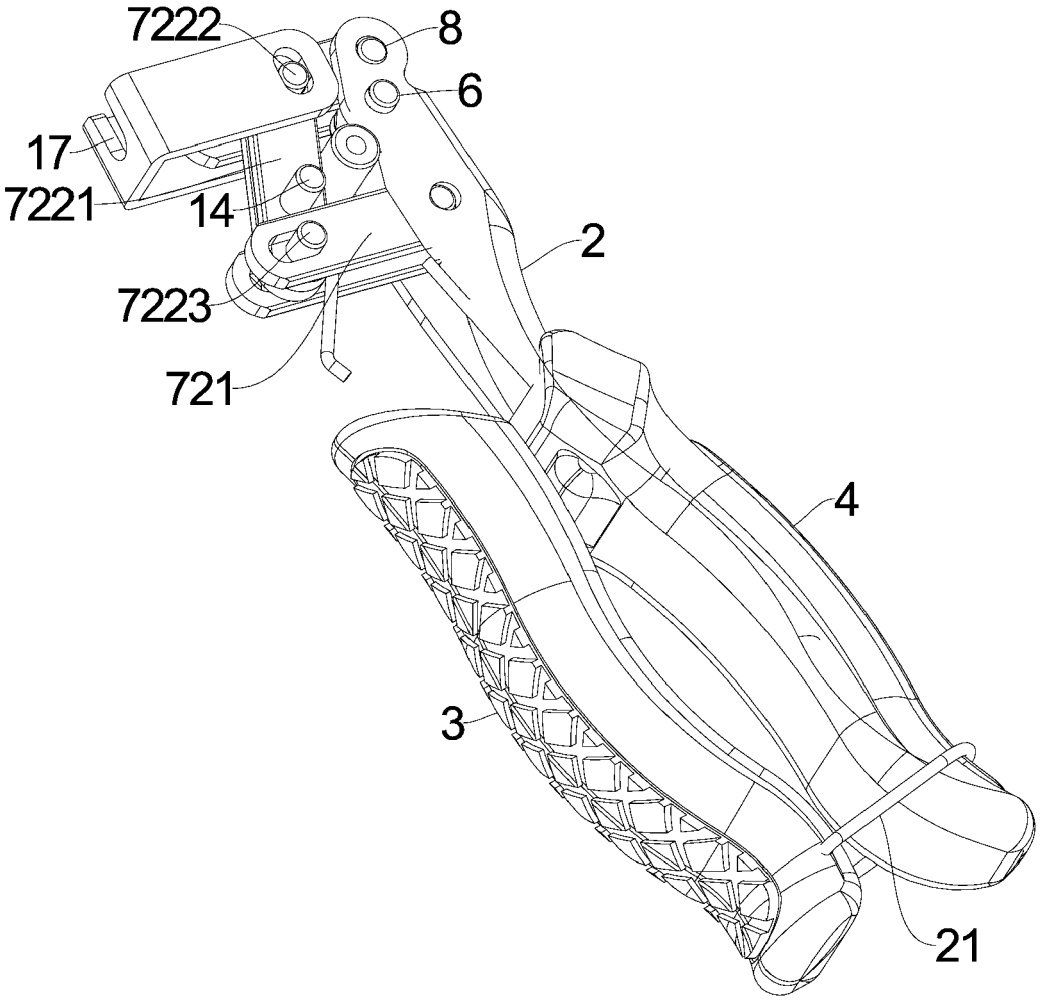

Fig. 3

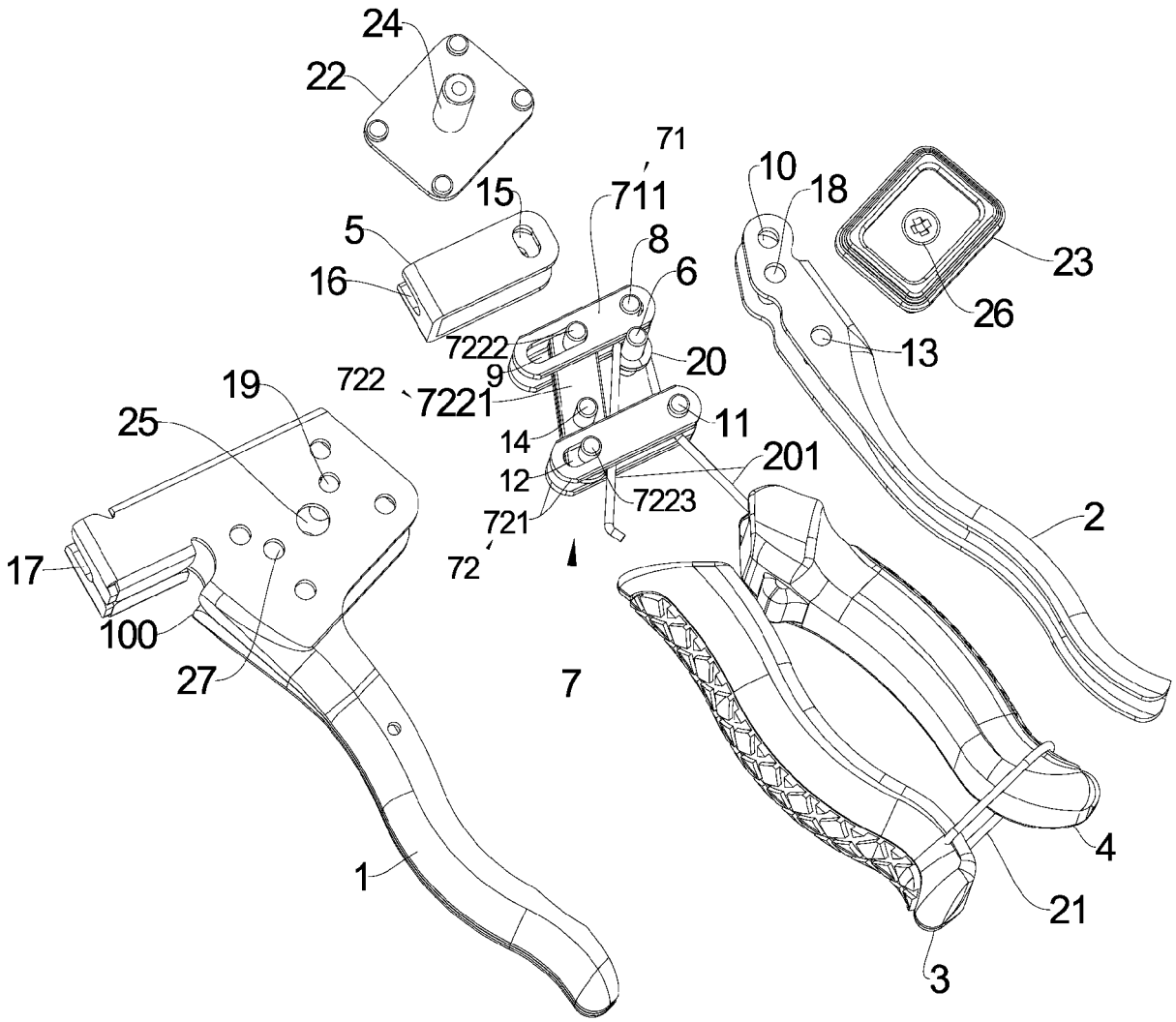
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Fig. 4

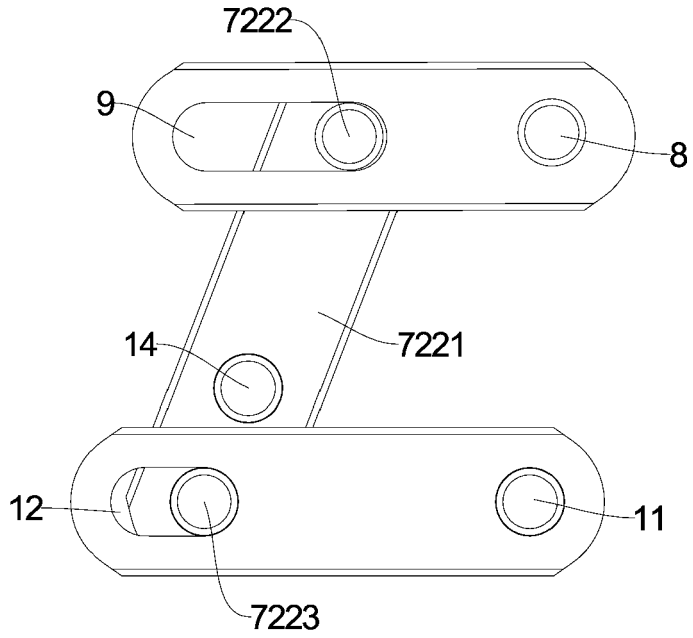

Fig. 5

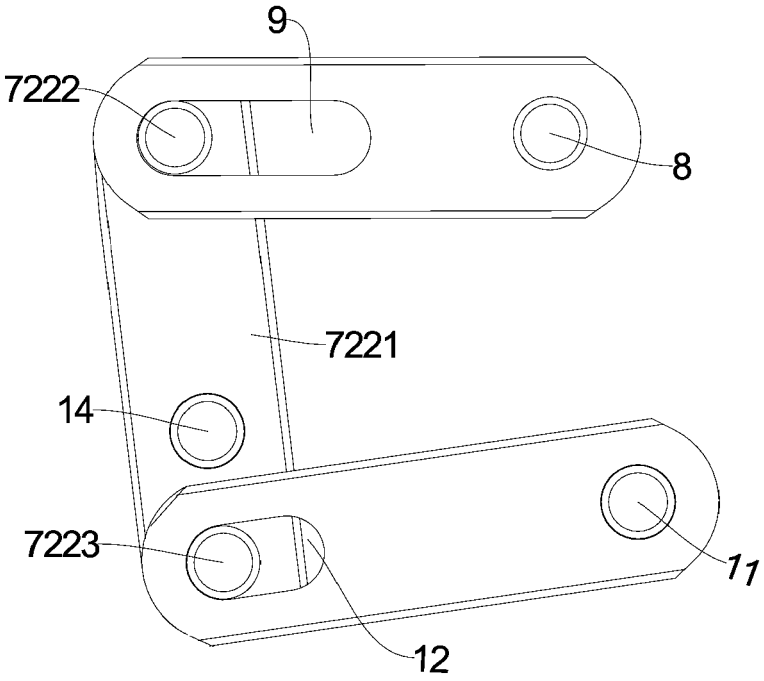

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 16 19 3239

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 February 2017	Hartnack, Kai

CATEGORY OF CITED DOCUMENTS

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