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(54) **Machining method for positive and negative pole pieces of lithium battery.**

(57) The present invention relates to a machining method for positive and negative pole pieces of a lithium battery. All raw materials in the positive and negative poles of the lithium battery are as follows in parts by mass: 80-100 parts of an electrode active material, 60-80 parts of a solvent, 5-10 parts of a binder and 1-4 parts of a conductive agent. Preparation of electrode slurry: mixing the electrode active material, the solvent, the binder and the conductive agent together, and performing full stirring and dispersion to form slurry; coating: uniformly coating a current collector with the slurry prepared in the first step, and drying the solvent; and blanking of pole pieces: blanking, by a blanking device, the pole pieces prepared in the second step into a specified size and shape.

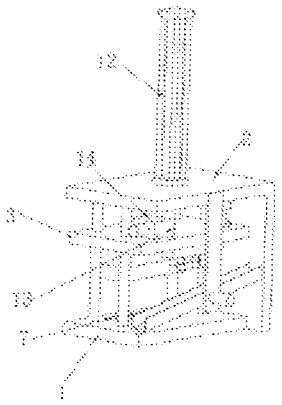


FIG. 1

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# MACHINING METHOD FOR POSITIVE AND NEGATIVE POLE PIECES OF LITHIUM BATTERY

## TECHNICAL FIELD

**[01]** The present invention relates to the technical field of lithium battery machining, in particular to a machining method for positive and negative pole pieces of a lithium battery.

## BACKGROUND ART

**[02]** Lithium battery is a battery which uses lithium metal or lithium alloy as a negative pole material and uses a non-aqueous electrolyte solution. Therefore, this battery is also referred to as a lithium metal battery.

**[03]** In a machining process, positive and negative pole pieces of a lithium battery are blanked into different shapes by a blanking device. However, the existing blanking device cannot limit pole pieces during blanking, and the pole pieces are prone to deviate during the blanking. In addition, after the blanking is completed, the pole pieces need to be manually unloaded, instead of being automatically unloaded, so that the automation degree is low.

## SUMMARY

**[04]** The problem solved by the present invention is to provide a machining method for positive and negative pole pieces of a lithium battery. The following technical problems are solved: In a machining process, positive and negative poles of a lithium battery are blanked into different shapes by a blanking device. However, the existing blanking device cannot limit pole pieces during blanking, and the pole pieces are prone to deviate during the blanking. In addition, after the blanking is completed, the pole pieces need to be manually unloaded, instead of being automatically unloaded, so that the automation degree is low.

**[05]** In order to achieve the foregoing purpose, the present invention adopts the following technical solution.

A machining method for positive and negative pole pieces of a lithium battery is provided. All raw materials in the positive and negative poles of the lithium battery are as follows in parts by mass:

80-100 parts of an electrode active material, 60-80 parts of a solvent, 5-10 parts of a binder and 1-4 parts of a conductive agent;

specific operations of the machining method are as follows:

step I: preparation of electrode slurry: mixing the electrode active material, the solvent, the binder and the conductive agent together, and performing full stirring and dispersion to form slurry;

step II: coating: uniformly coating a current collector with the slurry prepared in the first step, and drying the solvent; and

step III: blanking of pole pieces: blanking, by a blanking device, the pole pieces prepared in step II into a specified size and shape, wherein the pole piece moves on a base; a pressure bar works to drive a piston rod to move, thus driving a lifting seat to

move; an upper press-cutting die on the lifting seat cooperates with a lower press-cutting die on the base to press and cut the pole piece; a movable frame plate of a limiting mechanism is first in contact with the pole piece; when the upper press-cutting die continuously presses the pole piece, the movable frame plate compresses first springs in an inner cavity of a fixed frame plate; the movable frame plate is pressed on a top side of the pole piece under the action of the first springs to limit the pole piece in the press-cutting process; at the same time, the press-cut pole piece continuously moves; when the pole piece passes below suction discs, as the lifting seat moves down, the suction discs are in contact with the press-cut pole piece; an air pump works, and a negative pressure is generated in the suction discs to suck the pole piece; after stamping, when the lifting seat moves up to be in contact with a limiting plate, a supporting rod drives a first piston to move up and compress a second spring to press the air in a top barrel into a side barrel; a second piston in the side barrel drives a connecting rod to move, and an unloading slot is moved to be below the suction discs; the air pump works; the blanked pole piece falls from the suction discs onto the unloading slot to complete unloading; when the lifting seat moves down again, the air in the side barrel is sucked into the top barrel through the second spring; and the unloading slot is moved to one side of the lifting seat to avoid blockage to the lifting seat and the moving pole piece.

**[06]** Preferably, the blanking device includes the base, the supporting seat and the lifting seat; the L-shaped supporting seat is mounted at a top of the base; several guide rods are mounted between the base and the supporting seat; the lifting seat is slidably mounted on outer sides of the guide rods.

The upper press-cutting die and the limiting mechanism are mounted on a bottom side of the lifting seat; the limiting mechanism is located on an outer side of the upper press-cutting die; several supporting pipes are mounted on the bottom side of the lifting seat; the suction discs are mounted at bottom ends of the supporting pipes; a side plate is mounted on a side wall of the supporting seat; and the unloading slot is slidably mounted on the side plate.

**[07]** Preferably, the pressure bar is mounted at a top of the supporting seat; and the piston rod of the pressure bar is connected with the lifting seat through the supporting seat.

**[08]** Preferably, the limiting mechanism includes the fixed frame plate and the movable frame plate; the movable frame plate is elastically mounted inside the fixed frame plate; and a bottom end of the movable frame plate is located on the outer side of the fixed frame plate.

**[09]** Preferably, the inner cavity is formed inside the fixed frame plate; several first springs are mounted inside the inner cavity; and bottom ends of the first springs are all connected with the movable frame plate.

**[10]** Preferably, the air pump is mounted on the top side of the lifting seat; and the air pump is communicated with the supporting pipes.

**[11]** Preferably, the top barrel is mounted on a bottom side of the top of the lifting seat; a second spring is mounted inside the top barrel; the second spring is connected with the first piston; the first piston is connected with a top end of the supporting rod; and a bottom end of the supporting rod runs through a bottom of the top barrel and is

provided with the limiting plate.

**[12]** Preferably, the side barrel is mounted on the side plate; an end of the side barrel away from the side plate is connected with a top end of the top barrel by means of an air pipe; the second piston is mounted inside the side barrel; the second piston is connected with one end of the connecting rod; and the other end of the connecting rod is connected with the unloading slot.

**[13]** Beneficial effects of the present invention are as follows: During press-cutting by a press-cutting device, when an upper press-cutting die continuously presses the pole piece, a movable frame plate compresses first springs in an inner cavity of a fixed frame plate; the movable frame plate is pressed on a top side of the pole piece under the action of the first springs to limit the pole piece in the press-cutting process, which avoids deviation of the pole piece in the press-cutting process and guarantees the press-cutting accuracy.

Meanwhile, the press-cut pole piece continuously moves; when the pole piece passes below suction discs, as the lifting seat moves down, the suction discs are in contact with the press-cut pole piece; an air pump works, and a negative pressure is generated in the suction discs to suck the pole piece; after stamping, when the lifting seat moves up to be in contact with a limiting plate, a supporting rod drives a first piston to move up and compress a second spring to press the air in a top barrel into a side barrel; a second piston in the side barrel drives a connecting rod to move, and an unloading slot is moved to be below the suction discs; the air pump works; the blanked pole piece falls from the suction discs onto the unloading slot to complete unloading; when the lifting seat moves down again, the air in the side barrel is sucked into the top barrel through the second spring; the unloading slot is moved to one side of the lifting seat to avoid blockage to the lifting seat and the moving pole piece; and the press-cut piece is automatically unloaded according to a moving state of the lifting seat, so that the automation degree is high, and the actual operation and application are facilitated.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[14]** FIG. 1 is a schematic diagram of an overall first structure of the present invention;

FIG. 2 is a schematic diagram of an overall first structure of the present invention;

FIG. 3 is a side view of the present invention;

FIG. 4 is an internally schematic structural diagram of a limiting mechanism of the present invention; and

FIG. 5 is an internally schematic structural diagram of a top barrel and a side barrel of the present invention.

**[15]** Illustrations in the drawings:

1: base; 2: supporting seat; 3: lifting seat; 4: guide rod; 5: upper press-cutting die; 6: limiting mechanism; 7: lower press-cutting die; 8: supporting pipe; 9: suction disc; 10: side plate; 11: unloading slot; 12: pressure bar; 13: piston rod; 14: air pump; 15: fixed frame plate; 16: movable frame plate; 17: inner cavity; 18: first spring; 19: top barrel; 20: side barrel; 21: second spring; 22: first piston; 23: supporting rod; 24: limiting plate;

25: second piston; and 26: connecting rod.

## DETAILED DESCRIPTION OF THE EMBODIMENTS

**[16]** The technical solutions in the embodiments of the present invention will be described clearly and completely below in combination with the accompanying drawings of the embodiments of the present invention. Apparently, the described embodiments are only part of the embodiments of the present invention, not all embodiments. Based on embodiments of the present invention, all other embodiments obtained by those of ordinary skill in the art without creative work shall fall within the scope of protection of the present invention.

**[17]** Specific embodiments are provided below.

**[18]** Referring to FIG. 1 to FIG. 5, a machining method for positive and negative pole pieces of a lithium battery is provided. All raw materials in the positive and negative poles of the lithium battery are as follows in parts by mass:

80-100 parts of an electrode active material, 60-80 parts of a solvent, 5-10 parts of a binder and 1-4 parts of a conductive agent;

specific operations of the machining method are as follows:

step I: preparation of electrode slurry: the electrode active material, the solvent, the binder and the conductive agent are mixed together, and full stirring and dispersion is performed to form slurry;

step II: coating: a current collector is uniformly coated with the slurry prepared in the first step, and the solvent is dried; and

step III: blanking of pole pieces: a blanking device blanks the pole pieces prepared in step II into a specified size and shape. The pole piece moves on a base 1; at this time, a pressure bar 12 works to drive a piston rod 13 to move, thus driving a lifting seat 3 to move; at this time, an upper press-cutting die 5 on the lifting seat 3 cooperates with a lower press-cutting die 7 on the base 1 to press and cut the pole piece; at this time, a movable frame plate 16 of a limiting mechanism 6 is first in contact with the pole piece; and when the upper press-cutting die 5 continuously presses the pole piece, the movable frame plate 16 compresses first springs 18 in an inner cavity 17 of a fixed frame plate 15. The movable frame plate 16 is pressed on a top side of the pole piece under the action of the first springs 18 to limit the press-cut pole piece. Meanwhile, the press-cut pole piece continuously moves; when the pole piece passes below suction discs 9, as the lifting seat 3 moves down, the suction discs 9 are in contact with the press-cut pole piece; an air pump 14 works, and a negative pressure is generated in the suction discs 9 to suck the pole piece; after stamping, when the lifting seat 3 moves up to be in contact with a limiting plate 24, a supporting rod 23 drives a first piston 22 to move up and compress a second spring 21 to press the air in a top barrel 19 into a side barrel 20; a second piston 25 in the side barrel 20 drives a connecting rod 26 to move, and an unloading slot 11 is moved to be below the suction discs 9; the air pump 14 works; the blanked pole piece falls from the suction discs 9 onto the unloading slot 11 to complete unloading; when the lifting seat 3 moves down again, the air in the side barrel 20 is sucked into the top barrel 19 through the second spring 21; and the unloading slot 11 is moved to one side of the lifting seat 3 to avoid blockage to the lifting seat 3 and

the moving pole piece.

**[19]** The blanking device includes the base 1, the supporting seat 2 and the lifting seat 3; the L-shaped supporting seat 2 is mounted at a top of the base 1; several guide rods 4 are mounted between the base 1 and the supporting seat 2; the lifting seat 3 is slidably mounted on outer sides of the guide rods 4; the pressure bar 12 is mounted at a top of the supporting seat 2; and the piston rod 13 of the pressure bar 12 is connected with the lifting seat 3 through the supporting seat 2. The pressure bar 12 works to enable the lifting seat 3 to rise and drop.

The upper press-cutting die 5 and the limiting mechanism 6 are mounted on a bottom side of the lifting seat 3; the limiting mechanism 6 is located on an outer side of the upper press-cutting die 5; several supporting pipes 8 are mounted on the bottom side of the lifting seat 3; the suction discs 9 are mounted at bottom ends of the supporting pipes 8; a side plate 10 is mounted on a side wall of the supporting seat 2; the unloading slot 11 is slidably mounted on the side plate 10; the limiting mechanism 6 includes the fixed frame plate 15 and the movable frame plate 16; the movable frame plate 16 is elastically mounted inside the fixed frame plate 15; a bottom end of the movable frame plate 16 is located on the outer side of the fixed frame plate 15; the inner cavity 17 is formed inside the fixed frame plate 15; several first springs 18 are mounted inside the inner cavity 17; and bottom ends of the first springs 18 are all connected with the movable frame plate 16. When the upper press-cutting die 5 continuously presses the pole piece, the movable frame plate 16 compresses first springs 18 in the inner cavity 17 of the fixed frame plate 15; and the movable frame plate 16 is pressed on a top side of the pole piece under the action of the first springs 18 to limit the press-cut pole piece. The air pump 14 is mounted on the top side of the lifting seat 3; the air pump 14 is communicated with the supporting pipes 8. The air pump 14 works to realize suction and separation between the suction discs 9 and the press-cut pole piece. The top barrel 19 is mounted on a bottom side of the top of the lifting seat 3; a second spring 21 is mounted inside the top barrel 19; the second spring 21 is connected with the first piston 22; the first piston 22 is connected with a top end of the supporting rod 23; and a bottom end of the supporting rod 23 runs through a bottom of the top barrel 19 and is provided with the limiting plate 24. The side barrel 20 is mounted on the side plate 10; an end of the side barrel 20 away from the side plate 10 is connected with a top end of the top barrel 19 by means of an air pipe; the second piston 25 is mounted inside the side barrel 20; the second piston 25 is connected with one end of the connecting rod 26; and the other end of the connecting rod 26 is connected with the unloading slot 11. The lifting seat 3 moves up to be in contact with the limiting plate 24, and at this time, the supporting rod 23 drives the first piston 22 to move up and compress the second spring 21 to press the air in the top barrel 19 into the side barrel 20; the second piston 25 in the side barrel 20 drives the connecting rod 26 to move, and the unloading slot 11 is moved to be below the suction discs 9; the air pump 14 works; the blanked pole piece falls from the suction discs 9 onto the unloading slot 11 to complete unloading; when the lifting seat 3 moves down again, the air in the side barrel 20 is sucked into the top barrel 19 through the second spring 21; and the unloading slot 11 is moved to one side of the lifting seat 3.

**[20]** During press-cutting by the press-cutting device, when the upper press-cutting die 5 continuously presses the pole piece, the movable frame plate 16 compresses the first springs 18 in the inner cavity 17 of the fixed frame plate 15; the movable frame plate 16 is pressed on a top side of the pole piece under the action of the first springs 18 to limit the pole piece in the press-cutting process, which avoids deviation of the pole piece in the press-cutting process and guarantees the press-cutting accuracy.

Meanwhile, the press-cut pole piece continuously moves; when the pole piece passes below the suction discs 9, as the lifting seat 3 moves down, the suction discs 9 are in contact with the press-cut pole piece; the air pump 14 works, and a negative pressure is generated in the suction discs 9 to suck the pole piece; after stamping, when the lifting seat 3 moves up to be in contact with the limiting plate 24, the supporting rod 23 drives the first piston 22 to move up and compress the second spring 21 to press the air in the top barrel 19 into the side barrel 20; the second piston 25 in the side barrel 20 drives the connecting rod 26 to move, and the unloading slot 11 is moved to be below the suction discs 9; the air pump 14 works; the blanked pole piece falls from the suction discs 9 onto the unloading slot 11 to complete unloading; when the lifting seat 3 moves down again, the air in the side barrel 20 is sucked into the top barrel 19 through the second spring 21; the unloading slot 11 is moved to one side of the lifting seat 3 to avoid blockage to the lifting seat 3 and the moving pole piece; and the press-cut piece is automatically unloaded according to a moving state of the lifting seat 3, so that the automation degree is high, and the actual operation and application are facilitated.

**[21]** The above descriptions are only specific preferred implementation modes of the present invention, but the scope of protection of the present invention is not limited thereto. For any person skilled in the art, within the technical scope disclosed by the present invention, equivalent substitutions or changes made according to the technical solution of the present invention and an inventive idea of the present invention shall all fall within the scope of protection of the present invention.

## CLAIMS:

1. A machining method for positive and negative pole pieces of a lithium battery, characterized in that all raw materials in the positive and negative poles of the lithium battery are as follows in parts by mass:

80-100 parts of an electrode active material, 60-80 parts of a solvent, 5-10 parts of a binder and 1-4 parts of a conductive agent;

specific operations of the machining method are as follows:

step I: preparation of electrode slurry: mixing the electrode active material, the solvent, the binder and the conductive agent together, and performing full stirring and dispersion to form slurry;

step II: coating: uniformly coating a current collector with the slurry prepared in the first step, and drying the solvent; and

step III: blanking of pole pieces: blanking, by a blanking device, the pole pieces prepared in step II into a specified size and shape, wherein the pole piece moves on a base (1); a pressure bar (12) works to drive a piston rod (13) to move, thus driving a lifting seat (3) to move; an upper press-cutting die (5) on the lifting seat (3) cooperates with a lower press-cutting die (7) on the base (1) to press and cut the pole piece; a movable frame plate (16) of a limiting mechanism (6) is first in contact with the pole piece; when the upper press-cutting die (5) continuously presses the pole piece, the movable frame plate (16) compresses first springs (18) in an inner cavity (17) of a fixed frame plate (15); the movable frame plate (16) is pressed on a top side of the pole piece under the action of the first springs (18) to limit the pole piece in the press-cutting process; at the same time, the press-cut pole piece continuously moves; when the pole piece passes below suction discs (9), as the lifting seat (3) moves down, the suction discs (9) are in contact with the press-cut pole piece; an air pump (14) works, and a negative pressure is generated in the suction discs (9) to suck the pole piece; after stamping, when the lifting seat (3) moves up to be in contact with a limiting plate (24), a supporting rod (23) drives a first piston (22) to move up and compress a second spring (21) to press the air in a top barrel (19) into a side barrel (20); a second piston (25) in the side barrel (20) drives a connecting rod (26) to move, and an unloading slot (11) is moved to be below the suction discs (9); the air pump (14) works; the blanked pole piece falls from the suction discs (9) onto the unloading slot (11) to complete unloading; when the lifting seat (3) moves down again, the air in the side barrel (20) is sucked into the top barrel (19) through the second spring (21); and the unloading slot (11) is moved to one side of the lifting seat (3) to avoid blockage to the lifting seat (3) and the moving pole piece.

2. The machining method for the positive and negative pole pieces of the lithium battery according to claim 1, characterized in that the blanking device comprises the base (1), the supporting seat (2) and the lifting seat (3); the L-shaped supporting seat (2) is mounted at a top of the base (1); several guide rods (4) are mounted between the base (1) and the supporting seat (2); the lifting seat (3) is slidably mounted on outer sides of the guide rods (4);

the upper press-cutting die (5) and the limiting mechanism (6) are mounted on a

bottom side of the lifting seat (3); the limiting mechanism (6) is located on an outer side of the upper press-cutting die (5); several supporting pipes (8) are mounted on the bottom side of the lifting seat (3); the suction discs (9) are mounted at bottom ends of the supporting pipes (8); a side plate (10) is mounted on a side wall of the supporting seat (2); and the unloading slot (11) is slidably mounted on the side plate (10).

3. The machining method for the positive and negative pole pieces of the lithium battery according to claim 2, characterized in that the pressure bar (12) is mounted at a top of the supporting seat (2); and the piston rod (13) of the pressure bar (12) is connected with the lifting seat (3) through the supporting seat (2).

4. The machining method for the positive and negative pole pieces of the lithium battery according to claim 2, characterized in that the limiting mechanism (6) comprises the fixed frame plate (15) and the movable frame plate (16); the movable frame plate (16) is elastically mounted inside the fixed frame plate (15); and a bottom end of the movable frame plate (16) is located on the outer side of the fixed frame plate (15).

5. The machining method for the positive and negative pole pieces of the lithium battery according to claim 4, characterized in that the inner cavity (17) is formed inside the fixed frame plate (15); several first springs (18) are mounted inside the inner cavity (17); and bottom ends of the first springs (18) are all connected with the movable frame plate (16).

6. The machining method for the positive and negative pole pieces of the lithium battery according to claim 2, characterized in that the air pump (14) is mounted on the top side of the lifting seat (3); and the air pump (14) is communicated with the supporting pipes (8).

7. The machining method for the positive and negative pole pieces of the lithium battery according to claim 2, characterized in that the top barrel (19) is mounted on a bottom side of the top of the lifting seat (3); a second spring (21) is mounted inside the top barrel (19); the second spring (21) is connected with the first piston (22); the first piston (22) is connected with a top end of the supporting rod (23); and a bottom end of the supporting rod (23) is provided with the limiting plate (24) through a bottom of the top barrel (19).

8. The machining method for the positive and negative pole pieces of the lithium battery according to claim 2, characterized in that the side barrel (20) is mounted on the side plate (10); an end of the side barrel (20) away from the side plate (10) is connected with a top end of the top barrel (19) by means of an air pipe; the second piston (25) is mounted inside the side barrel (20); the second piston (25) is connected with one end of the connecting rod (26); and the other end of the connecting rod (26) is connected with the unloading slot (11).

## ANSPRÜCHE

1. Bearbeitungsverfahren für positive und negative Polstücke einer Lithiumbatterie, **dadurch gekennzeichnet, dass** alle Rohmaterialien in den positiven und negativen Polen der Lithiumbatterie wie folgt in Masseteilen vorliegen:

   80-100 Teile eines aktiven Elektrodenmaterials, 60-80 Teile eines Lösungsmittels, 5-10 Teile eines Bindemittels und 1-4 Teile eines leitfähigen Mittels;

   spezifische Arbeitsvorgänge des Bearbeitungsverfahrens sind wie folgt:

   Schritt I: Herstellung einer Elektrodenaufschlämmung: Mischen des aktiven Elektrodenmaterials, des Lösungsmittels, des Bindemittels und des leitfähigen Mittels und vollständiges Verrühren und Dispergieren zur Bildung einer Aufschlämmung;

   Schritt II: Beschichten: gleichmäßiges Beschichten eines Stromabnehmers mit der im ersten Schritt hergestellten Aufschlämmung und Trocknen des Lösungsmittels; und

   Schritt III: Stanzen der Polstücke: Stanzen der in Schritt II vorbereiteten Polstücke durch eine Stanzvorrichtung in eine bestimmte Größe und Form, wobei sich das Polstück auf einer Basis (1) bewegt; eine Druckstange (12) arbeitet, um eine Kolbenstange (13) anzutreiben, um sich zu bewegen, wodurch ein Hebesitz (3) angetrieben wird, um sich zu bewegen; ein oberes Press-Stanzwerkzeug (5) auf dem Hebesitz (3) arbeitet mit einem unteren Press-Stanzwerkzeug (7) auf der Basis (1) zusammen, um das Polstück zu pressen und zu schneiden; eine bewegliche Rahmenplatte (16) eines Begrenzungsmechanismus (6) ist zuerst in Kontakt mit dem Polstück; wenn das obere Press-Stanzwerkzeug (5) kontinuierlich gegen das Polstück presst, drückt die bewegliche Rahmenplatte (16) erste Federn (18) in einem inneren Hohlraum (17) einer festen Rahmenplatte (15) zusammen; die bewegliche Rahmenplatte (16) wird unter der Wirkung der ersten Federn (18) auf eine Oberseite des Polstücks gepresst, um das Polstück in dem Press-Stanzvorgang zu begrenzen; gleichzeitig bewegt sich das pressgestanzte

Polstück kontinuierlich; wenn das Polstück unter Saugscheiben (9) durchläuft, sind die Saugscheiben (9) in Kontakt mit dem pressgestanzten Polstück, wenn sich der Hebesitz (3) nach unten bewegt; eine Luftpumpe (14) arbeitet, und ein Unterdruck wird in den Saugscheiben (9) erzeugt, um das Polstück anzusaugen; nach dem Ausstanzen, wenn sich der Hebesitz (3) nach oben bewegt, um in Kontakt mit einer Begrenzungsplatte (24) zu sein, treibt eine Stützstange (23) einen ersten Kolben (22) an, um sich nach oben zu bewegen und eine zweite Feder (21) zusammenzudrücken, um die Luft in einem oberen Zylinder (19) in einen seitlichen Zylinder (20) zu drücken; ein zweiter Kolben (25) in dem seitlichen Zylinder (20) treibt eine Verbindungsstange (26) an, um sich zu bewegen, und ein Entnahmeschlitz (11) wird so bewegt, dass er sich unter den Saugscheiben (9) befindet; die Luftpumpe (14) arbeitet; das gestanzte Polstück fällt von den Saugscheiben (9) auf den Entnahmeschlitz (11), um die Entnahme abzuschließen; wenn sich der Hebesitz (3) wieder nach unten bewegt, wird die Luft in dem seitlichen Zylinder (20) durch die zweite Feder (21) in den oberen Zylinder (19) gesaugt; und der Entnahmeschlitz (11) wird zu einer Seite des Hebesitzes (3) bewegt, um eine Blockierung des Hebesitzes (3) und des sich bewegenden Polstücks zu verhindern.

2. Bearbeitungsverfahren für die positiven und negativen Polstücke der Lithiumbatterie nach Anspruch 1, **dadurch gekennzeichnet, dass** die Stanzvorrichtung die Basis (1), den Stützsitz (2) und den Hebesitz (3) aufweist; der L-förmige Stützsitz (2) an einer Oberseite der Basis (1) angebracht ist; mehrere Führungsstangen (4) zwischen der Basis (1) und dem Stützsitz (2) angebracht sind; der Hebesitz (3) verschiebbar an den Außenseiten der Führungsstangen (4) angebracht ist;

das obere Press-Stanzwerkzeug (5) und der Begrenzungsmechanismus (6) an einer Unterseite des Hebesitzes (3) angebracht sind; der Begrenzungsmechanismus (6) sich an einer Außenseite des oberen Press-Stanzwerkzeugs (5) befindet; mehrere Stützrohre (8) an der Unterseite des Hebesitzes (3) angebracht sind; die Saugscheiben (9) an unteren Enden der

Stützrohre (8) angebracht sind; eine Seitenplatte (10) an einer Seitenwand des Stützsitzes (2) angebracht ist; und der Entnahmeschlitz (11) verschiebbar an der Seitenplatte (10) angebracht ist.

3. Bearbeitungsverfahren für die positiven und negativen Polstücke der Lithiumbatterie nach Anspruch 2, **dadurch gekennzeichnet, dass** die Druckstange (12) an einer Oberseite des Stützsitzes (2) angebracht ist; und die Kolbenstange (13) der Druckstange (12) mit dem Hebesitz (3) durch den Stützsitz (2) verbunden ist.

4. Bearbeitungsverfahren für die positiven und negativen Polstücke der Lithiumbatterie nach Anspruch 2, **dadurch gekennzeichnet, dass** der Begrenzungsmechanismus (6) die feste Rahmenplatte (15) und die bewegliche Rahmenplatte (16) aufweist; die bewegliche Rahmenplatte (16) elastisch innerhalb der festen Rahmenplatte (15) montiert ist; und ein unteres Ende der beweglichen Rahmenplatte (16) sich an der Außenseite der festen Rahmenplatte (15) befindet.

5. Bearbeitungsverfahren für die positiven und negativen Polstücke der Lithiumbatterie nach Anspruch 4, **dadurch gekennzeichnet, dass** der innere Hohlraum (17) innerhalb der festen Rahmenplatte (15) ausgebildet ist; mehrere erste Federn (18) innerhalb des inneren Hohlraums (17) angebracht sind; und untere Enden der ersten Federn (18) alle mit der beweglichen Rahmenplatte (16) verbunden sind.

6. Bearbeitungsverfahren für die positiven und negativen Polstücke der Lithiumbatterie nach Anspruch 2, **dadurch gekennzeichnet, dass** die Luftpumpe (14) an der Oberseite des Hebesitzes (3) angebracht ist; und die Luftpumpe (14) mit den Stützrohren (8) verbunden ist.

7. Bearbeitungsverfahren für die positiven und negativen Polstücke der Lithiumbatterie nach Anspruch 2, **dadurch gekennzeichnet, dass** der obere Zylinder (19) an einer Unterseite der Oberseite des Hebesitzes (3) angebracht

ist; eine zweite Feder (21) innerhalb des oberen Zylinders (19) angebracht ist; die zweite Feder (21) mit dem ersten Kolben (22) verbunden ist; der erste Kolben (22) mit einem oberen Ende der Stützstange (23) verbunden ist; und ein unteres Ende der Stützstange (23) mit der Begrenzungsplatte (24) durch eine Unterseite des oberen Zylinders (19) versehen ist.

8. Bearbeitungsverfahren für die positiven und negativen Polstücke der Lithiumbatterie nach Anspruch 2, **dadurch gekennzeichnet, dass** der seitliche Zylinder (20) an der Seitenplatte (10) montiert ist; ein von der Seitenplatte (10) entferntes Ende des seitlichen Zylinders (20) mit einem oberen Ende des oberen Zylinders (19) mittels eines Luftrohrs verbunden ist; der zweite Kolben (25) innerhalb des seitlichen Zylinders (20) montiert ist; der zweite Kolben (25) mit einem Ende der Verbindungsstange (26) verbunden ist; und das andere Ende der Verbindungsstange (26) mit dem Entnahmeschlitz (11) verbunden ist.

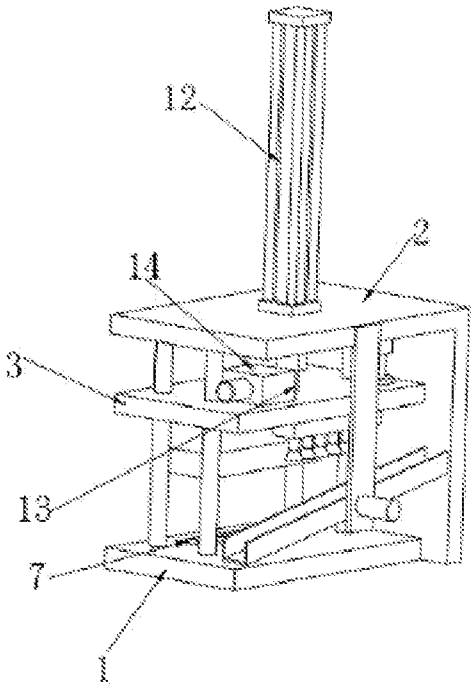


FIG. 1

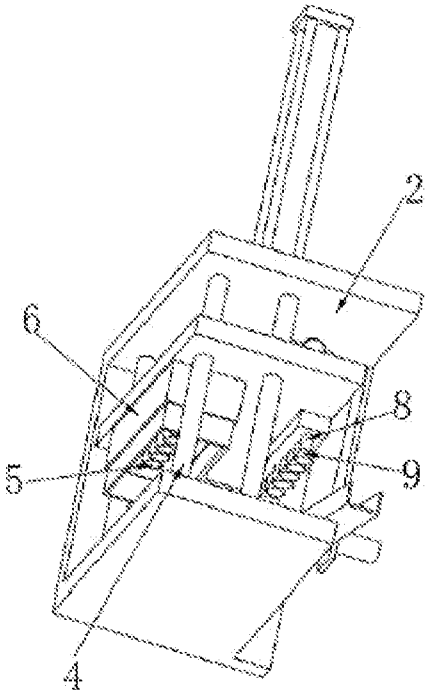


FIG. 2

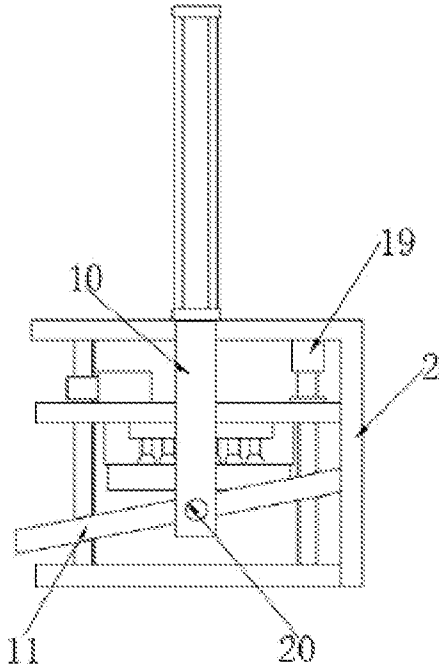


FIG. 3

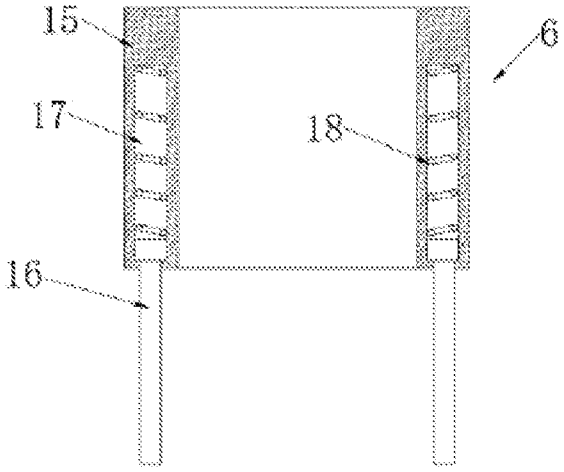


FIG. 4

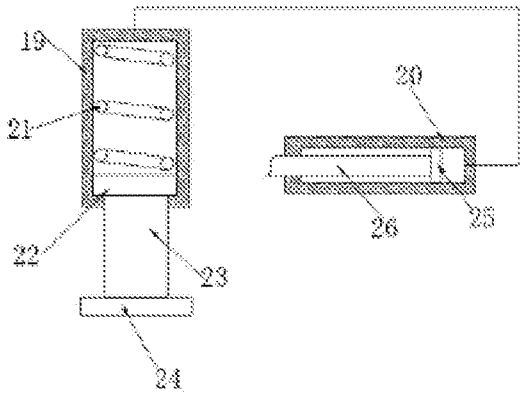


**FIG. 5**