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Titulaire(s):

West Anhui University – 237012 Luan City, Anhui
Province (Chine)

72

Inventeur(s):

GONG Dongmei – 237012 Lu'an City, Anhui
Province (Chine), XU Feng – 237012 Lu'an City, Anhui
Province (Chine)

74

Mandataire(s):

OFFICE FREYLINGER S.A. – L-
8001 STRASSEN (Luxembourg)

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Numerically controlled machine tool capable of preventing offset of workpiece.

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The present invention discloses a numerically controlled machine tool capable of preventing offset of a workpiece, comprising a slide rail, wherein a slide seat is slidably mounted on the slide rail; a gas pressure platform is fixedly mounted on the slide seat; a plurality of gas holes are opened in the gas pressure platform; each of the gas holes is slidably mounted with a gas rod therein; the Sower end of each of the gas rods is fixedly mounted with a piston; and the upper ends of the plurality of gas rods are commonly fixedly mounted with a fixed platform; and a plurality of fixed clamp seats are mounted on the fixed platform. The present invention controls the fixed platform to fix the height of the workpiece by connecting a first gas nozzle, and controls a pneumatic screwdriver to clamp the workpiece by connecting a second gas nozzle. The detachable installation of the fixed damp seat and a pressure block increases the flexibility of the device to fix the workpiece and the applicability.

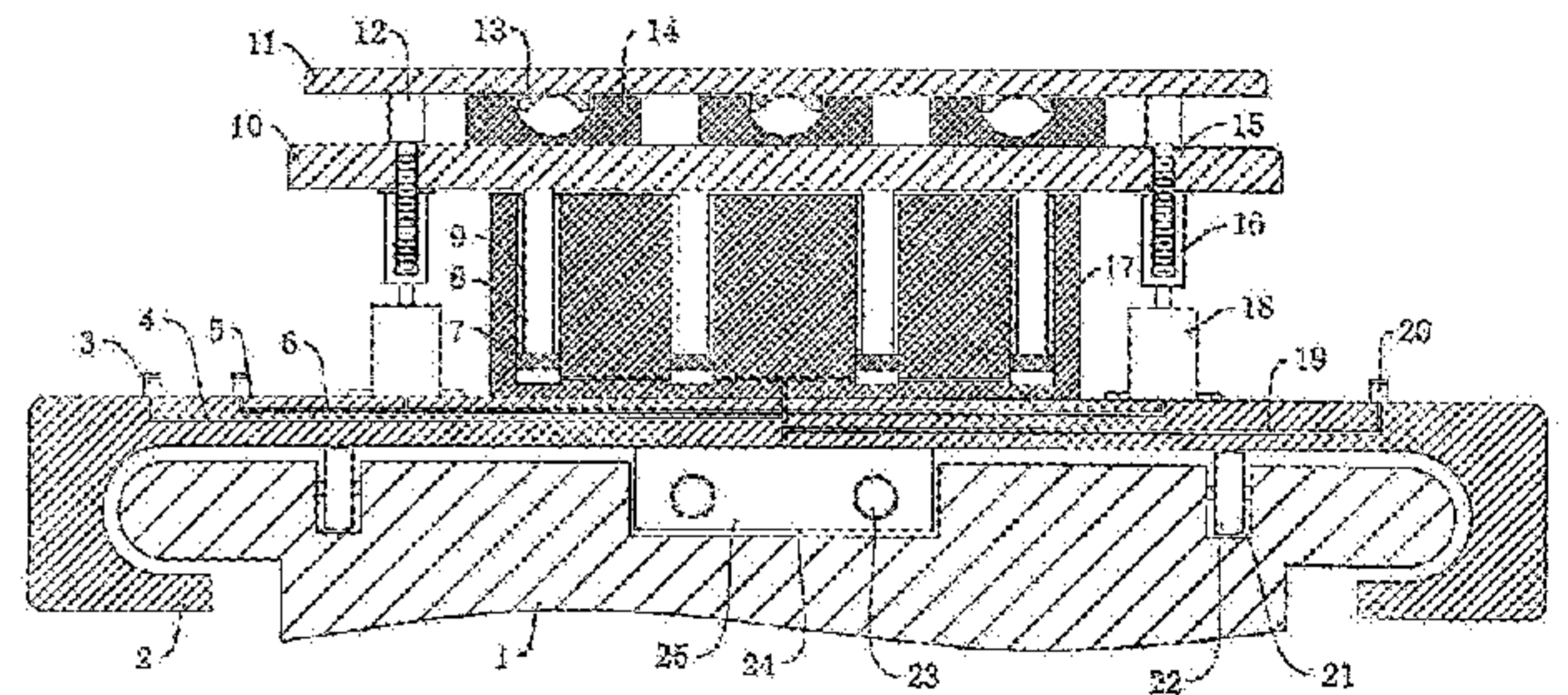


Fig. 1

NUMERICALLY CONTROLLED MACHINE TOOL
CAPABLE OF PREVENTING OFFSET OF WORKPIECE

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Technical field

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The present invention relates to the field of mechanical equipment, in particular to a numerically controlled machine tool capable of preventing offset of a workpiece.

Technical background

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With the technological development of the machinery industry, the production efficiency of numerically controlled machine tools is getting higher and higher. When a workpiece is processed, various parts can be processed by different processing tools, etc., and the numerically controlled machine tools can reduce the used manual operation and facilitate long-term work.

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Existing numerically controlled machine tools cannot adjust the fixed height of the workpiece when the workpiece is fixed to process. Without proper height, it is impossible to observe the morphological process of processing the workpiece so that the error cannot be corrected in time, and the position of the workpiece cannot be adjusted at will, which is prone to shaking or offset, resulting in low processing accuracy and even scrap of the workpiece.

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Summary of the invention

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In order to solve the disadvantages existing in the prior art that the height of the workpiece and the position of the workpiece on the machine tool cannot be adjusted, an objective of the present invention is to propose a numerically controlled machine tool capable of preventing the offset of the workpiece.

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In order to achieve the above objective, the present invention adopts the following technical solution:

A numerically controlled machine tool capable of preventing offset of a workpiece, LU101685 comprising a slide rail, a slide seat is slidably mounted on the slide rail; a gas pressure platform is fixedly mounted on the slide seat; a plurality of gas holes are opened in the gas pressure platform; each of the gas holes is slidably mounted with
5 a gas rod therein; the lower end of each of the gas rods is fixedly mounted with a piston; the upper ends of the plurality of gas rods are commonly fixedly mounted with a fixed platform; a plurality of fixed clamp seats are mounted on the fixed platform; an arc-shaped clamp slot is provided on each of the fixed clamp seats; a segment of the workpiece is placed in the arc-shaped clamp slot to fix; and the
10 fixed platform and the slide seat are commonly mounted with a clamping mechanism thereon.

Preferably, the clamping mechanism comprises a plurality of fixed pneumatic screwdrivers symmetrically fixedly mounted on the slide seat; the output end of
15 each of the fixed pneumatic screwdrivers is mounted with a threaded cap; a threaded rod is threadedly mounted in each of the threaded caps; the upper end of each of the threaded rods is slidably inserted in the fixed platform and extends above the fixed platform; the upper end of each of the threaded rods is welded with a limiting post; the upper ends of a plurality of limiting posts are commonly mounted
20 with a pressure plate; and the bottom wall of the pressure plate is mounted with a plurality of pressure blocks, and the plurality of pressure blocks are in one-to-one correspondence with the plurality of fixed clamp seats.

When the fixed pneumatic screwdriver is operating, the fixed pneumatic
25 screwdriver drives the threaded cap to rotate, so that the threaded rod moves up and down, and the pressure plate is moved up and down through the limiting post, which causes the pressure block to move up and down. That is, it can fix different diameters of thin and thick workpieces to process.

30 Preferably, a plurality of first threaded holes are opened on one side of the fixed platform; the fixed clamp seat is mounted on the upper surface of the fixed platform by locking screws and the first threaded holes; a plurality of second threaded holes are opened on the lower bottom surface of the pressure plate, and the plurality of second threaded holes are in one-to-one correspondence with the plurality of first

threaded holes; and the pressure block is fixed on the lower bottom surface of the pressure plate by screws and the second threaded holes.

The fixed clamp seat can be arbitrarily mounted on the surface of the fixed platform having the first threaded holes through disassembly and assembly of screws, so that the position and number of the fixed clamp seat can each be adjusted.

Preferably, a first gas nozzle is mounted on the slide seat; a first control gas pipe is embedded in the slide seat, and the first control gas pipe is connected to the first gas nozzle; a plurality of first branch pipes are connected to the first control gas pipe; a plurality of synchronous gas pipes are embedded in the gas pressure platform, and the plurality of synchronous gas pipes are in communication with a plurality of gas holes, respectively; and the plurality of first branch pipes are in communication with the plurality of synchronous gas pipes, respectively.

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The first gas nozzle is connected to a gas pressure controller of the machine tool. When the gas pressure controller changes the gas pressure of the first gas nozzle, the gas pressure in the gas hole increases or decreases, the piston and the gas rod rise or fall, and the fixed platform rises or falls with the plurality of gas rods, so that different heights can be adjusted as needed when the workpiece is processed.

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Preferably, a second gas nozzle is mounted on the slide seat; a second control gas pipe is embedded in the slide seat, and the second control gas pipe is connected to the second gas nozzle; a plurality of second branch pipes are connected to the second control gas pipe; and the plurality of second branch pipes are connected to the plurality of fixed pneumatic screwdrivers, respectively.

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Preferably, a cylinder is fixedly mounted at the lower end of the slide seat; the upper end of the slide rail is opened with a slide groove, two slide rods are fixedly mounted on the slide rail, and the cylinder is slidably sleeved on the two slide rods; the cylinder is slidably mounted in the slide groove; a third gas nozzle is mounted on the slide seat; a third control gas pipe is embedded in the slide seat; and two ends of the third control gas pipe are connected to the cylinder and the third gas nozzle, respectively.

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The third gas nozzle is connected to the gas pressure controller of the machine tool. When the gas pressure controller changes the gas pressure of the third gas nozzle, the cylinder slides on the two slide rods, so that the slide seat slides on the slide rail
5 without manually adjusting the position of the slide seat.

The upper surface of the slide rail is symmetrically opened with two rolling grooves thereon, each rolling groove is rotably mounted with a plurality of rollers at an equal distance therein, and the upper ends of the plurality of rollers abut against the lower
10 bottom wall of the slide seat.

The roller rolls in the sliding process of the slide seat, which reduces the friction force between the slide seat and the slide rail, and can reduce the load of the two slide rods.
15

The present invention has the following beneficial effects:

1. The second gas nozzle, the second control gas pipe, the plurality of second branch pipes and the plurality of fixed pneumatic screwdrivers are communicated, and the fixed pneumatic screwdriver is controlled by the gas pressure to rotate
20 forwardly or reversely so that the pressure plate moves up or down. Therefore, the pressure block is far away from the fixed clamp seat, so that the workpiece can be easily placed in the arc-shaped clamp slot on the fixed clamp seat or the pressure block clamps the workpiece in the arc-shaped clamp slot on the fixed clamp seat
25 without manual loosening or clamping, reducing operation workload. Moreover, the pressure plate is locked by the screw cap, so that the pressure block locks the workpiece to increase the fixed strength.

2. The plurality of fixed clamp seats and the plurality of pressure blocks can fix a
30 plurality of workpieces for processing at the same time, and the plurality of fixed clamp seats can change the number and position of fixed clamp seats by disassembly and assembly of the screws and the first threaded holes. Meanwhile, the pressure blocks match the number and position of the fixed clamp seats by

disassembly and assembly of the screws and the second threaded holes, thereby U101685
increasing the flexibility of the device.

3. The first gas nozzle, the first control gas pipe, the plurality of first branch pipes,
5 the plurality of synchronous gas pipes, and the plurality of gas holes are
communicated, the change of the gas pressure in the plurality of gas holes can be
controlled, and the piston and the gas rod in the gas holes can be controlled to
move up and down. That is, the fixed platform can be caused to move up and down,
and the fixed height of the workpiece can be changed, increasing the flexibility of
10 processing and fixing the workpiece.

4. The slide rail and the slide seat slide in the slide groove by the cylinder, and a
plurality of rollers are symmetrically rotably embedded on two sides of the slide rail.
When the slide seat is driven by the cylinder to slide on the slide rail, a roller closely
15 attached to the bottom surface of the slide seat rotates, the slide friction force
between the slide seat and the slide rail is reduced, and the gravity load of the two
slide rods is reduced, increasing the service life of the slide rods.

In summary, the present invention controls the fixed platform to fix the height of the
20 workpiece by connecting a first gas nozzle, and controls a pneumatic screwdriver
to clamp the workpiece by connecting a second gas nozzle. The detachable
installation of the fixed clamp seat and the pressure block increases the flexibility of
the device to fix the workpiece and the applicability.

25 Brief description of the drawings

Fig. 1 is a schematic structural diagram of a numerically controlled machine tool
capable of preventing offset of a workpiece proposed by the present invention;

30 Fig. 2 is a partially enlarged view of a gas pressure platform of a numerically
controlled machine tool capable of preventing offset of a workpiece proposed by
the present invention;

Fig. 3 is a top view of a gas pressure platform of a numerically controlled machine

tool capable of preventing offset of a workpiece proposed by the present invention, U101685
and

Fig. 4 is a partially enlarged view of a fixed platform of a numerically controlled
5 machine tool capable of preventing offset of a workpiece proposed by the present
invention.

In the drawings: 1 slide rail, 2 slide seat, 3 first gas nozzle, 4 first control gas pipe, 5
second gas nozzle, 6 second control gas pipe, 7 piston, 8 gas rod, 9 gas hole, 10
10 fixed platform, 11 pressure plate, 12 limiting post, 13 pressure block, 14 fixed clamp
seat, 15 threaded rod, 16 threaded cap, 17 gas pressure platform, 18 fixed
pneumatic screwdriver, 19 third control gas pipe, 20 third gas nozzle, 21 rolling
groove, 22 roller, 23 slide rod, 24 slide groove, 25 cylinder, 26 synchronous gas
pipe, 27 first threaded hole.

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Detailed description of the embodiments

The technical solutions in the embodiments of the present invention will be clearly
and completely described below with reference to the accompanying drawings in
20 the embodiments of the present invention. Obviously, the described embodiments
are only a part of the embodiments of the present invention, and not all the
embodiments.

Referring to Figs. 1-4, a numerically controlled machine tool capable of preventing
25 offset of a workpiece includes a slide rail 1. A slide seat 2 is slidably mounted on the
slide rail 1, a gas pressure platform 17 is fixedly mounted on the slide seat 2, and a
plurality of gas holes 9 are opened in the gas pressure platform 17. Each gas hole
9 is slidably mounted with a gas rod 8 therein, and the lower end of each gas rod 8
is fixedly mounted with a piston 7. The upper ends of the plurality of gas rods 8 are
30 commonly mounted with a fixed platform 10, and a plurality of fixed clamp seats 14
are mounted on the fixed platform 10. Each fixed clamp seat 14 is opened with an
arc-shaped clamp slot. A segment of the workpiece is placed in the arc-shaped
clamp slot to fix. The fixed platform 10 and the slide seat 2 are commonly mounted
with a clamping mechanism thereon.

The clamping mechanism includes a plurality of fixed pneumatic screwdrivers 18 symmetrically fixedly mounted on the slide seat 2. The output end of each fixed pneumatic screwdriver 18 is mounted with a threaded cap 16. A threaded rod 15 is
5 threadedly mounted in each threaded cap 16. The upper end of each threaded rod 15 is slidably inserted in the fixed platform 10 and extends above the fixed platform 10. The upper end of each threaded rod 15 is welded with a limiting post 12. The upper ends of a plurality of limiting posts 12 are commonly mounted with a pressure plate 11. The bottom wall of the pressure plate 11 is mounted with a
10 plurality of pressure blocks 13, and the plurality of pressure blocks 13 are in one-to-one correspondence with the plurality of fixed clamp seats 14.

When the fixed pneumatic screwdriver 18 is operating, the fixed pneumatic screwdriver 18 drives the threaded cap 16 to rotate, so that the threaded rod 15
15 moves up and down, and the pressure plate 11 is moved up and down through the limiting post 12, which causes the pressure block 13 to move up and down. That is, it can fix different diameters of thin and thick workpieces to process.

A plurality of first threaded holes 27 are opened on one side of the fixed platform 10.
20 The fixed clamp seat 14 is mounted on the upper surface of the fixed platform 10 by locking screws and the first threaded holes 27. A plurality of second threaded holes are opened on the lower bottom surface of the pressure plate 11, and the plurality of second threaded holes are in one-to-one correspondence with the plurality of first threaded holes 27. The pressure block 13 is fixed on the lower bottom surface
25 of the pressure plate 11 by screws and the second threaded holes.

The fixed clamp seat 14 can be arbitrarily mounted on the surface of the fixed platform 10 having the first threaded holes 27 through disassembly and assembly of screws, so that the position and number of the fixed clamp seat 14 can each be
30 adjusted.

A first gas nozzle 13 is mounted on the slide seat 2. A first control gas pipe 4 is embedded in the slide seat 2, and the first control gas pipe 4 is connected to the first gas nozzle 3. A plurality of first branch pipes are connected to the first control

gas pipe 4. A plurality of synchronous gas pipes 26 are embedded in the gas pressure platform 17, and the plurality of synchronous gas pipes 26 are in communication with a plurality of gas holes 9, respectively. The plurality of first branch pipes are in communication with the plurality of synchronous gas pipes 26, respectively.

The first gas nozzle 3 is connected to a gas pressure controller of the machine tool. When the gas pressure controller changes the gas pressure of the first gas nozzle 3, the gas pressure in the gas hole 9 increases or decreases, the piston 7 and the gas rod 8 rise or fall, and the fixed platform 10 rises or falls with the plurality of gas rods 8, so that different heights can be adjusted as needed when the workpiece is processed.

A second gas nozzle 5 is mounted on the slide seat 2. A second control gas pipe 6 is embedded in the slide seat 2, and the second control gas pipe 6 is connected to the second gas nozzle 5. A plurality of second branch pipes are connected to the second control gas pipe 6. The plurality of second branch pipes are connected to the plurality of fixed pneumatic screwdrivers 18, respectively.

A cylinder 25 is fixedly mounted at the lower end of the slide seat 2. The upper end of the slide rail 1 is opened with a slide groove 24, two slide rods 23 are fixedly mounted on the slide rail 1, and the cylinder 25 is slidably sleeved on the two slide rods 23. The cylinder 25 is slidably mounted in the slide groove 24. A third gas nozzle 20 is mounted on the slide seat 2. A third control gas pipe 19 is embedded in the slide seat 2, and two ends of the third control gas pipe 19 are connected to the cylinder 25 and the third gas nozzle 20, respectively.

The third gas nozzle 20 is connected to the gas pressure controller of the machine tool. When the gas pressure controller changes the gas pressure of the third gas nozzle 20, the cylinder 25 slides on the two slide rods 23, so that the slide seat 2 slides on the slide rail 1 without manually adjusting the position of the slide seat 2.

The upper surface of the slide rail 1 is symmetrically opened with two rolling grooves 21 thereon, each rolling groove 21 is rotably mounted with a plurality of

rollers 22 at an equal distance therein, and the upper ends of the plurality of rollers 22 abut against the lower bottom wall of the slide seat 2. U101685

The roller 22 rolls in the sliding process of the slide seat 2, which reduces the friction force between the slide seat 2 and the slide rail 1, and can reduce the load of the two slide rods 23.

In the present invention, when in use, the second gas nozzle 5 is controlled to perform air extraction by the gas pressure controller inherent in the machine tool, the plurality of fixed pneumatic screwdrivers 18 rotate reversely, the threaded cap 16 rotates reversely, and the threaded rod 15 is threadedly rotated out from the threaded cap 16 to move up. The pressure plate 11 moves up, and the pressure block 13 is away from the fixed clamp seat 14. Then, a workpiece is placed in the arc-shaped clamp slot of the plurality of linearly arranged fixed clamp seats 14, and the second gas nozzle 5 is controlled to pressurize, so that the fixed pneumatic screwdriver 18 rotate forwardly and the threaded rod 15 moves down. The pressure plate 11 moves down, that is, the pressure block 13 moves down and presses on the workpiece. As the fixed pneumatic screwdriver 18 continues to rotate forwardly, the threaded cap 16 is locked on the lower bottom surface of the fixed platform 10. At this time, the pressure block 13 and the fixed clamp seat 14 firmly clamp the workpiece. Next, the first gas nozzle 3 is controlled to pressurize, and the piston 7 and the gas rod 8 move upwardly in a high-pressure state, so that the fixed platform 10 moves up, and stops when moving up to a proper position. Then, the third gas nozzle 20 is controlled to pressurize, and the cylinder 25 slides along the two slide rods 23, so that the slide seat 2 slides on the slide rail 1, and the slide seat 2 moves to the designated area and then stops for starting processing.

The above are only the preferred embodiments of the present invention, but the scope of protection of the present invention is not limited to this. All the equivalent replacements or changes made by any person skilled in the art within the technical scope disclosed by the present invention according to the technical solutions of the present invention and the invention concept thereof should be covered within the scope of protection of the present invention.

Claims

1. A numerically controlled machine tool capable of preventing offset of a workpiece,
5 comprising a slide rail (1), characterized in that a slide seat (2) is slidably mounted
on the slide rail (1); a gas pressure platform (17) is fixedly mounted on the slide
seat (2); a plurality of gas holes (9) are opened in the gas pressure platform (17);
each of the gas holes (9) is slidably mounted with a gas rod (8) therein; the lower
10 end of each of the gas rods (8) is fixedly mounted with a piston (7); and the upper
ends of the plurality of gas rods (8) are commonly fixedly mounted with a fixed
platform (10); a plurality of fixed clamp seats (14) are mounted on the fixed platform
(10); and the fixed platform (10) and the slide seat (2) are commonly mounted with
a clamping mechanism thereon.

15 2. The numerically controlled machine tool capable of preventing offset of the
workpiece according to claim 1, characterized in that the clamping mechanism
comprises a plurality of fixed pneumatic screwdrivers (18) symmetrically fixedly
mounted on the slide seat (2); the output end of each of the fixed pneumatic
screwdrivers (18) is mounted with a threaded cap (16); a threaded rod (15) is
20 threadedly mounted in each of the threaded caps (16); the upper end of each of the
threaded rods (15) is slidably inserted in the fixed platform (10) and extends above
the fixed platform (10); the upper end of each of the threaded rods (15) is welded
with a limiting post (12); the upper ends of a plurality of limiting posts (12) are
commonly mounted with a pressure plate (11); and the bottom wall of the pressure
25 plate (11) is mounted with a plurality of pressure blocks (13).

3. The numerically controlled machine tool capable of preventing offset of the
workpiece according to claim 2, characterized in that a plurality of first threaded
holes (27) are opened on one side of the fixed platform (10); the fixed clamp seat
30 (14) is mounted on the upper surface of the fixed platform (10) by locking screws
and the first threaded holes (27); and a plurality of second threaded holes are
opened on the lower bottom surface of the pressure plate (11).

4. The numerically controlled machine tool capable of preventing offset of the

workpiece according to claim 1, characterized in that a first gas nozzle (3) is mounted on the slide seat (2); a first control gas pipe (4) is embedded in the slide seat (2); a plurality of first branch pipes are connected to the first control gas pipe (4); and a plurality of synchronous gas pipes (26) are embedded in the gas pressure platform (17).

5. The numerically controlled machine tool capable of preventing offset of the workpiece according to claim 2, characterized in that a second gas nozzle (5) is mounted on the slide seat (2); a second control gas pipe (6) is embedded in the slide seat (2); a plurality of second branch pipes are connected to the second control gas pipe (6); and the plurality of second branch pipes are connected to the plurality of fixed pneumatic screwdrivers (18), respectively.

6. The numerically controlled machine tool capable of preventing offset of the workpiece according to claim 1, characterized in that a third gas nozzle (20) is mounted on the slide seat (2), and a third control gas pipe (19) is embedded in the slide seat (2).

Patentansprüche:

1. NC-Werkzeugmaschine, die ein Versetzen eines Werkstücks verhindern kann,
5 umfassend eine Gleitschiene (1), dadurch gekennzeichnet, dass ein Gleitsitz (2)
verschiebbar auf der Gleitschiene (1) montiert ist, wobei eine Gasdruckplattform
(17) fest auf dem Gleitsitz (2) montiert ist, wobei mehrere Gaslöcher (9) in der
Gasdruckplattform (17) geöffnet sind, und wobei jedes der Gaslöcher (9)
10 verschiebbar mit einem Gasstab (8) darin montiert ist, wobei das untere Ende jeder
der Gasstäbe (8) fest mit einem Kolben (7) montiert ist; und wobei die oberen
Enden der mehreren Gasstäbe (8) zusammen mit einer festen Plattform (10) fest
montiert sind; wobei mehrere feste Klemmsitze (14) auf der festen Plattform (10)
montiert sind; und wobei die feste Plattform (10) und der Gleitsitz (2) zusammen
mit einem Klemmmechanismus darauf montiert sind.

15

2. NC-Werkzeugmaschine, die ein Versetzen eines Werkstücks verhindern kann,
nach Anspruch 1, dadurch gekennzeichnet, dass der Spannmechanismus mehrere
feststehende pneumatische Schraubendreher (18) umfasst, die symmetrisch fest
auf dem Gleitsitz (2) montiert sind, wobei wobei das Ausgangsende jedes der
20 festen pneumatischen Schraubendreher (18) mit einer Gewindekappe (16)
montiert ist; wobei eine Gewindestange (15) mit einem Gewinde in jeder der
Gewindekappen (16) montiert ist, wobei das obere Ende jeder der
Gewindestangen (15) verschiebbar in die feste Plattform (10) eingeführt ist und
sich über die feste Plattform (10) erstreckt; wobei das obere Ende jeder der
25 Gewindestangen (15) mit einer Begrenzungsstange (12) verschweißt ist; wobei die
oberen Enden mehrerer Begrenzungspole (12) zusammen mit einer Druckplatte
(11) montiert sind; und wobei die Bodenwand der Druckplatte (11) mit mehreren
Druckblöcken (13) montiert ist.

30

3. NC-Werkzeugmaschine, die ein Versetzen eines Werkstücks verhindern kann,
nach Anspruch 2, dadurch gekennzeichnet, dass mehrere erste
Gewindebohrungen (27) auf einer Seite der festen Plattform (10) geöffnet sind;
wobei der feste Klemmsitz (14) auf der Oberseite der festen Plattform (10) durch
Verriegelungsschrauben und die ersten Gewindelöcher (27) angebracht ist; und

wobei mehrere zweite Gewindebohrungen an der unteren Bodenfläche der Druckplatte (11) geöffnet sind. lu101685

5 4. NC-Werkzeugmaschine, die ein Versetzen eines Werkstücks verhindern kann, nach Anspruch 1, dadurch gekennzeichnet, dass wobei eine erste Gasdüse (3) an dem Gleitsitz (2) angebracht ist; wobei eine erste Steuergasleitung (4) in den Gleitsitz (2) eingebettet ist; wobei mehrere erste Abzweigrohre mit dem ersten Steuergasrohr (4) verbunden sind; und wobei mehrere synchrone Gasleitungen (26) in die Gasdruckplattform (17) eingebettet sind.

10

15 5. NC-Werkzeugmaschine, die ein Versetzen eines Werkstücks verhindern kann, nach Anspruch 2, dadurch gekennzeichnet, dass eine zweite Gasdüse (5) an dem Gleitsitz (2) angebracht ist; wobei eine zweite Steuergasleitung (6) in den Gleitsitz (2) eingebettet ist; wobei mehrere zweite Abzweigrohre mit dem zweiten Steuergasrohr (6) verbunden sind; und wobei die mehreren zweiten Abzweigrohre mit den mehreren festen pneumatischen Schraubendrehern (18) verbunden sind.

20 6. NC-Werkzeugmaschine, die ein Versetzen eines Werkstücks verhindern kann, nach Anspruch 1, dadurch gekennzeichnet, dass eine dritte Gasdüse (20) an dem Gleitsitz (2) angebracht ist und wobei eine dritte Steuergasleitung (19) in den Gleitsitz (2) eingebettet ist.

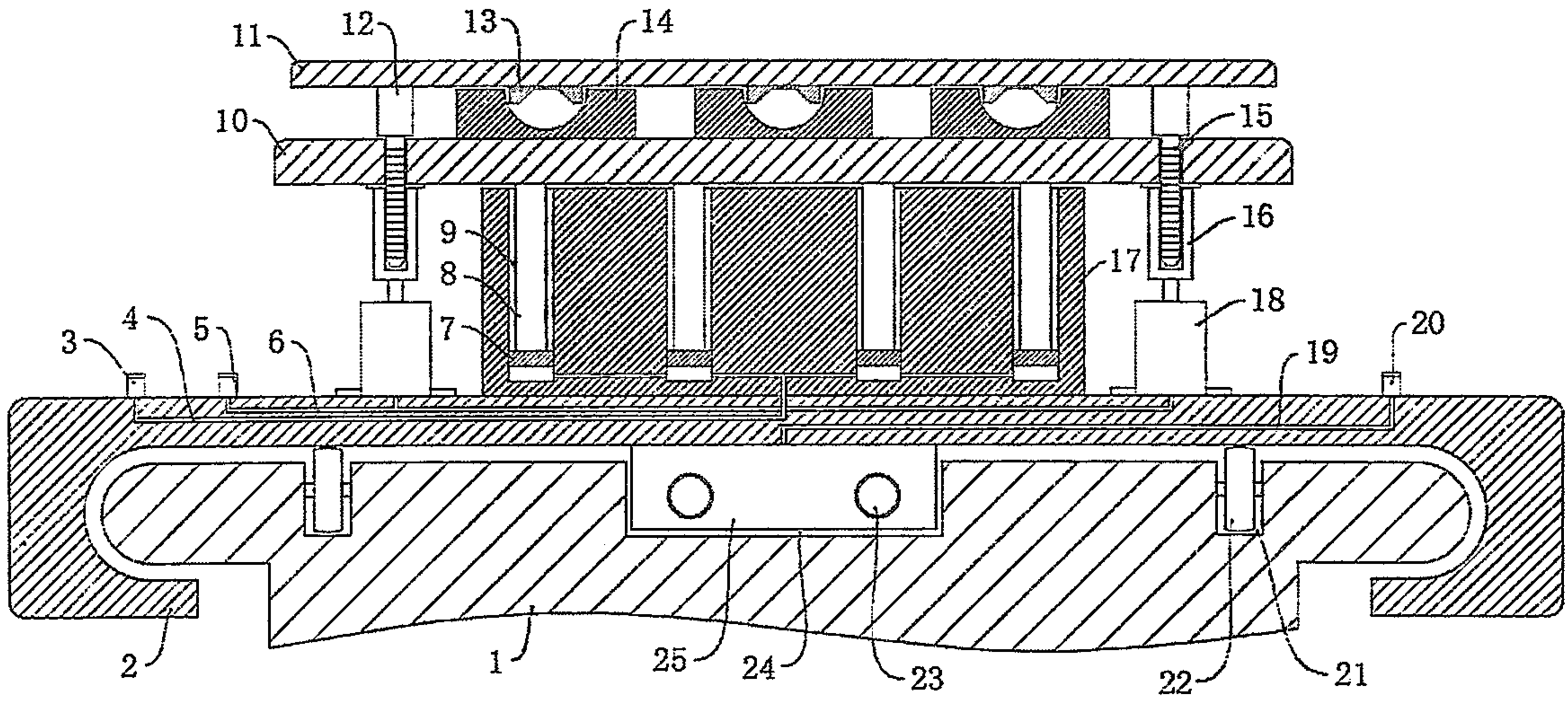


Fig.1

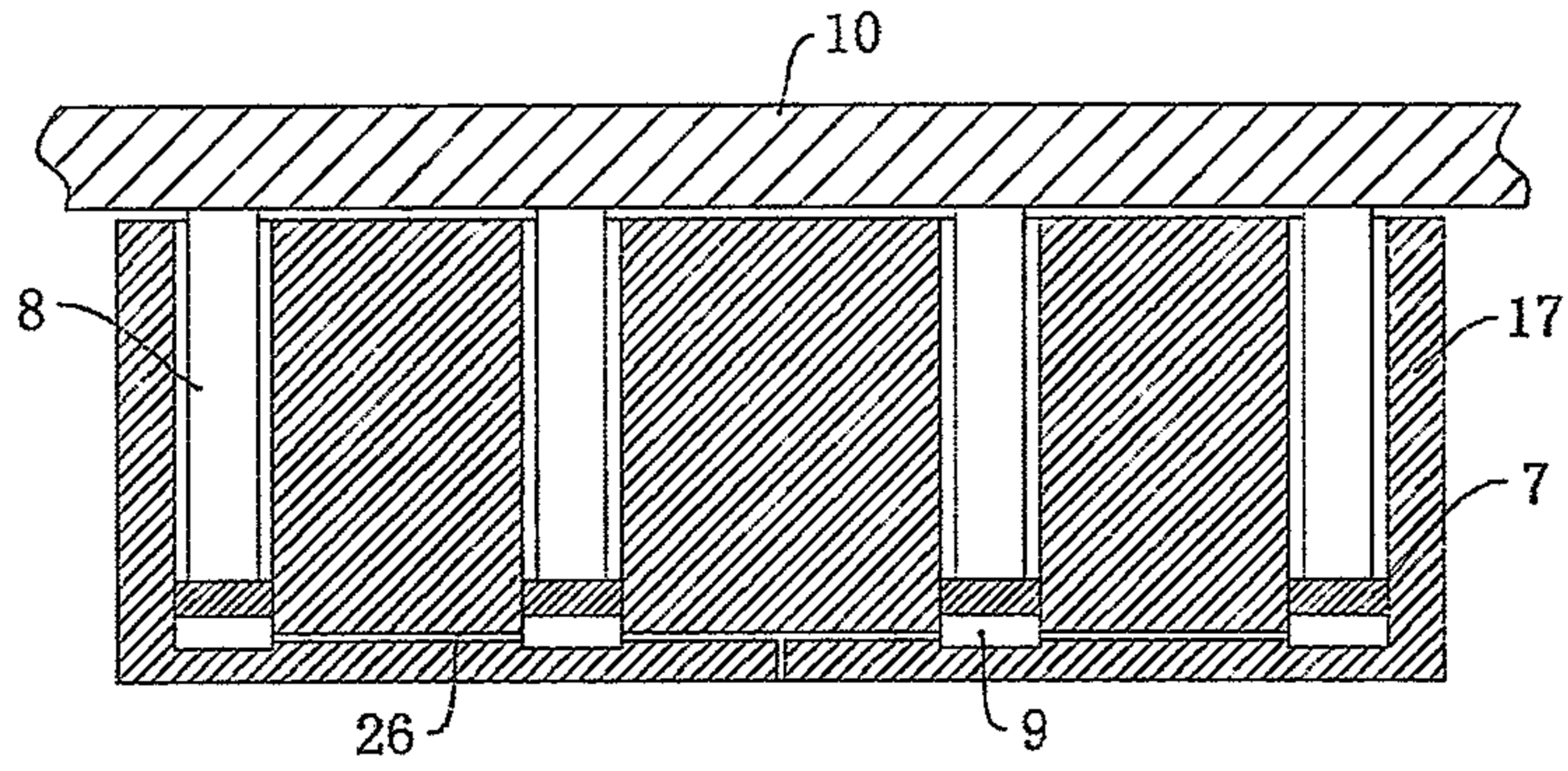


Fig.2

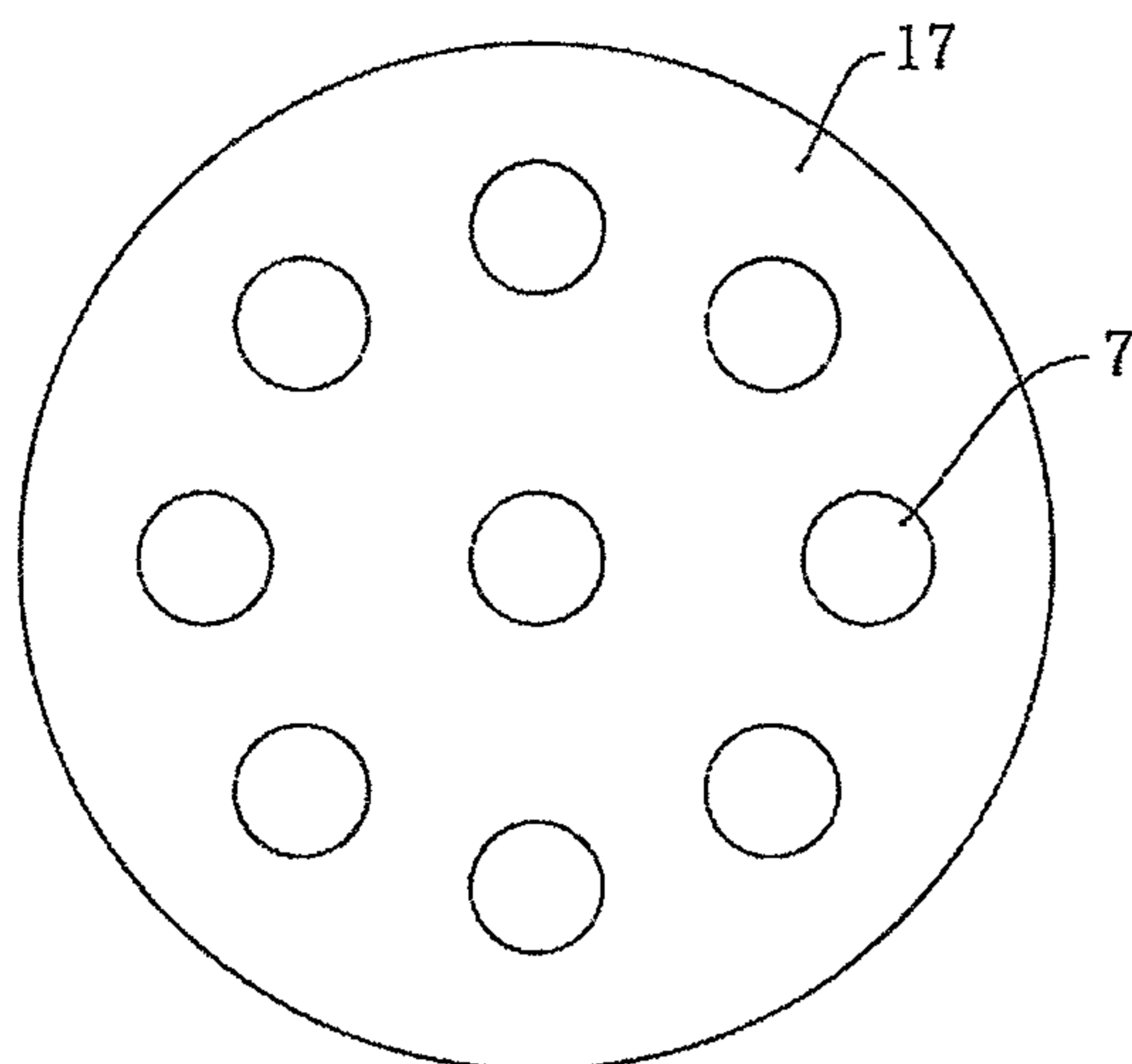


Fig.3

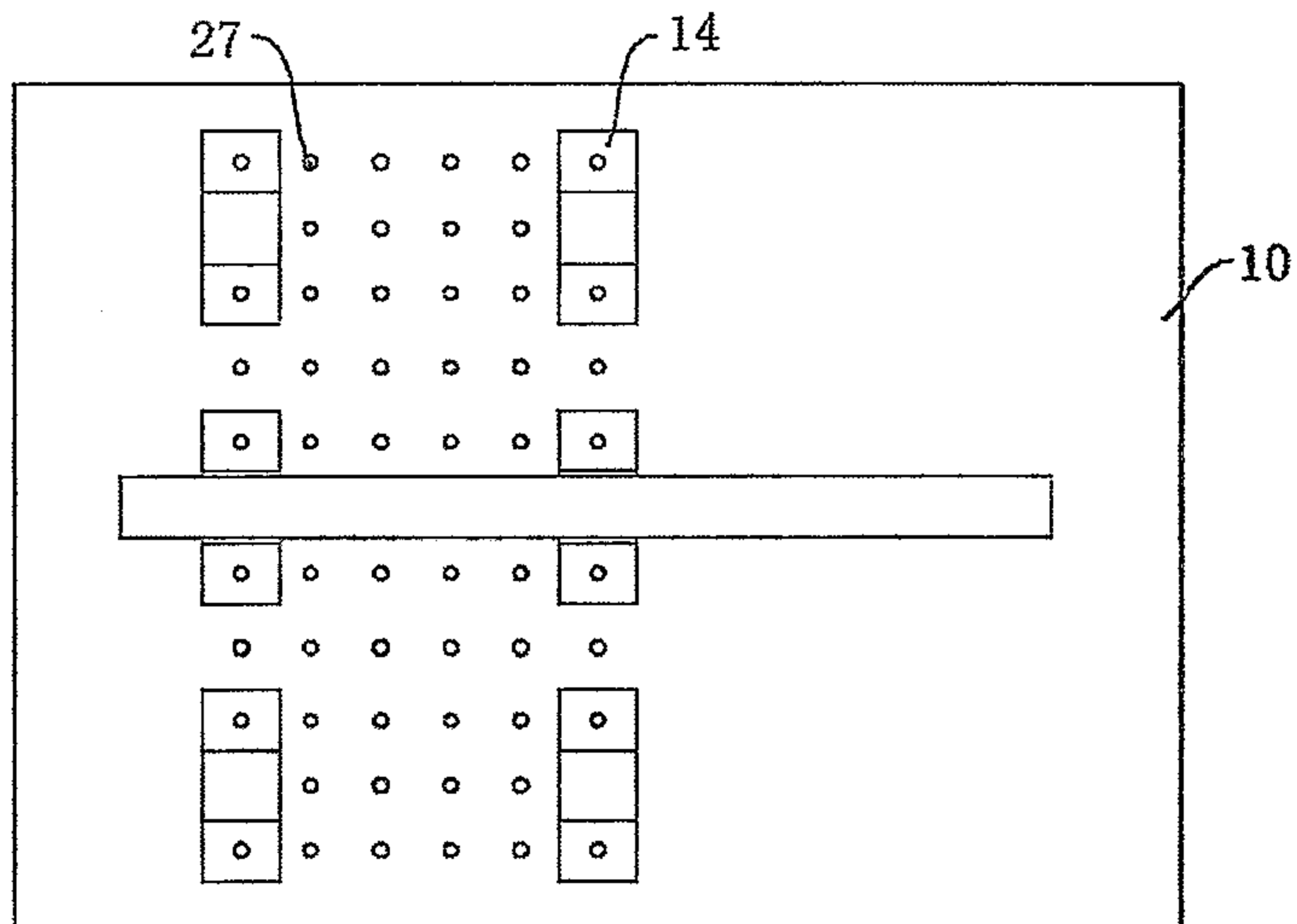


Fig.4