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(54) **A shift device for wheel head of sander**

Wechselvorrichtung für Scheibenträger einer Handschleifmaschine

Dispositif d'échange du support de disque d'une ponceuse

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Description

[0001] The present invention relates to electric tools, and more particularly to a shift device for a wheel head of a sander.

[0002] A sander is an electric tool which, when it is put in operation, is driven by means of an electric motor, and its eccentric mechanism drives the wheel head of the sander to work via transferring mechanism to sand the workpieces for example by means of an abrasive cloth.

[0003] In prior art, the wheel head of the sander is connected to the sander via support in a hoisting manner, and the output shaft of the eccentric mechanism is connected and fixed to the wheel head of the sander. During the operation, however, the users have to shift various wheel heads having different shapes according to the shapes of workpieces and the various actual circumstances.

[0004] To shift or exchange the wheel head in prior art is diverse and complicated. It is necessary to loosen fixed screw which fixes the wheel head to the support and the output shaft, and then to fetch out the wheel head to shift the wheel head. This is very inconvenient to the users and the work efficiency is much lower.

[0005] The objective of the present invention is to provide a shift device for a wheel head of sander capable of shifting or exchanging the wheel head of a sander quickly, which can improve the work efficiency and is very convenient to the end user.

[0006] To achieve this objective, a shift device for a wheel head of a sander, said device comprising an output shaft and a wheel head, is characterized by a latching device which is located in the output shaft and which is actuatable to a retracted position in which it is disposed within the output shaft and to an extended position in which it extends beyond the periphery of the output shaft and into a recess in the wheel head.

[0007] According to a preferred embodiment of the invention, the shift device is characterized in that said output shaft is inserted into a connecting hole of said wheel head; a hole is located in the center part of said output shaft and a slot is positioned at the end of said output shaft; a spring and a latch axis are disposed in said hole; two fix latches are disposed in said slot, said two latches stretch towards two sides of said slot and are inserted into a slot which is located on the wall of said connecting hole, said latch axis is connected with said two fix latches via a pin.

[0008] According to a preferred embodiment of the invention, the shift device is characterized in that said device further comprises: a polygonal blind hole located on said wheel head; a bed plate, the external shape of said bed plate matching with said polygonal blind hole; four positioning holes located on said bed plate; a front support and a rear support being inserted into said positioning holes respectively and fixed by screws passing through said positioning holes; a slot located at the up-

per part of said front support; a slot located at the upper part of said rear support; ribbed slabs with concave located on a left shell and a right shell; said front support and rear support being inserted into said ribbed slabs of said left shell and right shell respectively, said front support and rear support being assembled and fixed by said right shell and left shell respectively. This embodiment of the shift device is specially advantageous for a reciprocating wheel head of a sander.

[0009] According to a preferred embodiment of the invention, the shift device is characterized in that said wheel head has a blind hole with its diameter larger than the outline of the bed plate, and a transferring mechanism between the wheel head and the output shaft. This embodiment of the shift device is specially advantageous for a rotatable wheel head of a sander.

[0010] According to a preferred embodiment of the invention, the shift device is characterized by a waist shaped hole located in the middle of said wheel head, and a waist shaped shoulder matching with said waist shaped hole located at the lower part of said output shaft. The swirling action of said output shaft can be transferred to said wheel head in an advantageous manner by way of the coordination of said waist shaped hole and said waist shaped shoulder.

[0011] According to a preferred embodiment of the invention, the shift device is characterized by an adjusting screw, said adjusting screw being connected with the upper part of said hole via screw, a restricting sleeve disposed in said hole, and the lower part of said restricting sleeve being put on the top surface of said fix latches. It is possible in the embodiment to adjust the latching device in an easy way.

[0012] According to a preferred embodiment of the invention, the shift device is characterized by a ladder surface located on the outer surface of said latch axis, the upper part of said ladder surface being larger than the lower part of said ladder surface; and a ladder surface corresponding to the outer surface of said latch axis being located in said hole. Said latch axis will not fall off from the output shaft due to the special structure of ladder surface.

[0013] According to the preferred embodiment of the invention, the wheel head is fixed at the end of the output shaft by two fix latches and a spring is disposed in the hole of the output shaft. The spring presses the upper part of the latch axis to force the two ends of the two fix latches raised upward. On the other hand, said restricting sleeve presses the top surface of the fix latches, and the height of the fix latches can be adjusted via adjusting screw.

[0014] According to the preferred embodiment of the invention, the latch axis is pressed at the upper portion by the spring, and supported at the lower portion by ladder, so the latch axis will not fall off from the hole of said output shaft and the fix latch will not rotate upward and thus goes into said concave slot either.

[0015] In the case of the shift device for reciprocal

wheel head of sander of the present invention, there are front and rear supports disposed on the bed plate to restrict the wheel head, and to restrict the wheel head to move in a reciprocating manner. In the case of shift device for rotatable wheel head of sander of the present invention, the wheel head is disconnected with the bed plate. As a result, the wheel head does not contact the bed plate during the rotary motion.

[0016] When the wheel head is to be shifted, the lower end of the latch axis is lifted upward under the action of the restricting sleeve, the fix latch is rotated downward and goes into the concave slot. As a result, the wheel head is retrieved from the output shaft, and quick mounting and dismounting operation of the shift device for wheel head of sander is achieved.

[0017] Further preferred embodiments of the invention and the features thereof are given in the appended claims and sub-claims.

[0018] Preferred embodiments of the invention will now be described in detail in conjunction with the accompanying drawings in which:

- Figure 1 is a view showing the reciprocal wheel head of a sander;
 Figure 2 is the A-A cutaway view of Figure 1;
 Figure 3 is a view showing the rotatable wheel head of a sander,
 Figure 4 is the B-B cutaway view of Figure 3;
 Figure 5 is the view taken from Figure 2 showing the manner of mounting the left and right supports; and
 Figure 6 is the C-C cutaway view of Figure 4.

[0019] Referring to Figure 1 and Figure 2, the shift device for a wheel head of a sander of the present invention comprises an output shaft 1 and a wheel head 2. The output shaft 1 is inserted into a connecting hole 3 of the wheel head 2 and it is connected with a chuck 33 through a ball bearing 35. A hole 4 is located in the center part of the output shaft 1, and a slot 5 is located in the center part of the output shaft 1. A spring 6 and a latch axis 7 are disposed in the hole 4, stretching toward two sides. Two fix latches 8 are disposed in the slot 5 and the other end of the fix latch 8 is inserted in the slot 9 which is located on the wall of the connecting hole 3. The latch axis 7 is connected to the fix latch 8 via a pin 10.

[0020] Besides, there is a polygonal blind hole 16 located on the wheel head 2, the external shape of the bed plate 17 matches with the shape of the polygonal the hole 16. A protective sleeve 32 is disposed at the upper part of the bed plate 17, and four positioning holes 18 are located on the bed plate 17. The lower parts of the front support 19 and the rear support 20 are inserted into the positioning holes 18 to fix the front support 19 and the rear support 20 to the bed plate 17 by self-driven screws 21. A slot 22 is located at the upper part of the front support 19 and a slot 23 is located at the

upper part of the rear support 23. The ribbed slabs 25 are located on the left shell 24 and right shell 26 respectively, the front support 19 and the rear support 20 are inserted into the ribbed slab 25 respectively. Figure 5 shows the manner the front support 19 and the rear support 20 to be assembled and fixed.

[0021] Referring to Figures 1 and 2, a thread hole is located on the upper part of the hole 4, an adjusting screw 11 is mounted in the thread hole, a restricting sleeve 12 is disposed in the hole 4 below the adjusting screw 11. The lower part of the restricting sleeve 12 is abutting the upper part of the fix latches 8. A slot 13 is located at the lower part of the latch axis 7, and the two fix latches are inserted into the slot 5 and the slot 13. These two fix latches 8 are connected to the latch axis 7 via the pin 10. An end cover 14 is positioned at the lower part of the latch axis 7.

[0022] A ladder surface is located on the outer surface of the latch axis 7, and the upper diameter of the ladder surface is larger than the lower diameter of the ladder surface. A corresponding ladder surface is located in the hole 4 which is located at the lower part of the output shaft 1.

[0023] When the shift device is put in operation, the chuck 33 rotates about the centerline 34 of electric tools instrument. Owing to the polygonal blind hole 16 restricted by corresponding polygonal external shape of the bed plate 17, the wheel head 2 is grasped by the fix latch 8. Therefore, when the chuck 33 rotates, due to the eccentricity δ existed between the centerline 34 and centerline 31, the output shaft 1 moves reciprocally within reciprocal scope of 2δ .

[0024] Whenever the wheel head 2 is to be shifted, referring to Figure 1, the abrasive cloth 36 is torn from the wheel head 2, the end cover 14 is lifted upward, and then the fix latch 8 will be retrieved from the concave slot 9 into the slot 5 of the output shaft 1 and the wheel head 2 will be fetched out.

[0025] Figures 3 and 4 show a shift device for rotatable wheel head of a sander of the present invention. The basic structure of it is almost the same as that of the device for the reciprocal wheel head. The differences between the shift device for rotary wheel head of sander from the shift device for reciprocal wheel head are as follows. According to the shift device for rotatable wheel head of sander of the present invention, a blind hole 28 is located on a wheel 27, the diameter of the blind hole 28 is larger than the external diameter of the bed plate 17, and a driven device is disposed between the wheel head 27 and the output shaft 1. Referring to Figure 6, the waist hole 29 of the wheel head 27 matches with the waist shoulder 30 of the output shaft 1 to enable the output shaft 1 to drive the wheel head 27 into motion.

[0026] When the device is put in operation, the chuck 33 rotates about the centerline 34, owing to the eccentricity δ exists between centerline 34 and centerline 31, the output shaft 1 is driven into motion. Since the diameter of the blind hole 28 on wheel head 27 is larger than

the external size of the bed plate 17, and the tolerance δ between the external diameter of the center part of wheel head 27 and the hole of the bed plate 17 is bigger than the eccentricity δ , the output shaft 1 may rotate freely. The shoulder is inserted into the hole 29, and brings the wheel head 27 into eccentric rotary motion against the centerline 34.

[0027] When the wheel head 27 is to be shifted, the abrasive cloth 36 is torn from the wheel head 27, the end cover 14 is lifted upward, the fix latch 8 will be retrieved from the concave slot 9 into the slot 5 of the output shaft 1. Then, the wheel head 27 will be fetched out

Claims

1. A shift device for a wheel head of a sander, said device comprising an output shaft and a wheel head, **characterized by** a latching device (6,7,8) which is located in the output shaft (1) and which is actuatable to a retracted position in which it is disposed within the output shaft (1) and to an extended position in which it extends beyond the periphery of the output shaft (1) and into a recess (9) in the wheel head (2).
2. A shift device as claimed in claim 1, **characterized in that** said output shaft(1) is inserted into a connecting hole (3) of said wheel head (2); a hole (4) is located in the center of said output shaft (1) and a slot (5) is positioned at the end of said output shaft (1); a spring (6) and a latch axis (7) are disposed in said hole (4); two the fix latches (8) are disposed in said slot (5), said two fix latches (8) stretch towards two sides of said slot (5) and are inserted into a slot (9) which is located on the wall of said connecting hole (3), said latch axis (7) is connected with said two fix latches (8) via a pin (10).
3. A shift device as claimed in claim 1 or 2, **characterized in that** said device further comprises a polygonal blind hole (16) located on said wheel head (2); a bed plate (17), the external shape of said bed plate (17) matching with said polygonal blind hole (16); four positioning holes (18) located on said bed plate (17); a front support (19) and a rear support (20) being inserted into said positioning holes (18) respectively and fixed by screws (21) passing through said positioning holes (18); a slot (22) located at the upper part of said front support (19); a slot (23) located at the upper part of said rear support (20); ribbed slabs (25) with concave located on a left shell (24) and a right shell (26); said front support (19) and rear support (20) being inserted into said ribbed slabs (25) of said left shell (24) and right shell (26) respectively, said front support (19) and rear support (20) being assembled and fixed by said right shell (26) and left shell (24) respectively.

4. A shift device as claimed in claim 1 or 2, further **characterized by** a blind hole (28) disposed on a wheel head (27), the diameter of said blind hole (28) being larger than the external size of the bed plate (17); a driven device disposed between said wheel head (27) and said output shaft (1).
5. A shift device as claimed in claim 4, **characterized in that** a waist shaped hole (29) is located in the middle of said wheel head (27), and a waist shaped shoulder (30) matching with said waist shaped hole (29) is located at the lower part of said output shaft (1).
6. A shift device as claimed in any of the preceding claims, further **characterized by** an adjusting screw (11), said adjusting screw (11) being connected with the upper part of said hole (4) via screw; a restricting sleeve (12) disposed in said hole (4), and the lower part of said restricting sleeve (12) being put on the top surface of said fix latches (8).
7. A shift device as claimed in any of the preceding claims, further **characterized by** a slot (13) located at the lower part of said latch axis (7), said two fix latches (8) being inserted into said slot (5) and said slot (13) and connected with said latch axis (7) via a pin (10).
8. A shift device as claimed in claim 7, **characterized in that** an end cover (14) is positioned at the lower part of said latch axis (7).
9. A shift device as claimed in any of the preceding claims, further **characterized in that** a restricting device is disposed between the outer surface of the latch axis (7) and said hole (4) which is located at the lower part of said output shaft (1).
10. A shift device as claimed in claim 9, **characterized in that** said restricting device comprises a ladder surface (15) located on the outer surface of said latch axis (7), the upper part of said ladder surface (15) being larger than the lower part of said ladder surface(15); and a ladder surface (15) corresponding to the outer surface of said latch axis (7) being made on said hole (4).

Patentansprüche

1. Wechsellvorrichtung für einen Scheibenträger einer Schleifmaschine, wobei die Vorrichtung einer Ausgangswelle und einen Scheibenträger umfasst, **gekennzeichnet durch** eine Verriegelungseinrichtung (6, 7, 8), die in der Ausgangswelle (1) angeordnet ist und die in eine zurückgezogene Position, in der sie in der Ausgangswelle (1) angeordnet ist,

und einer ausgefahrenen Position betätigbar ist, in der sie sich über den Umfang der Ausgangswelle (1) und in eine Ausnehmung (9) in dem Scheibenträger (2) erstreckt.

2. Wechsellvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Ausgangswelle (1) in eine Verbindungsöffnung (3) des Scheibenträgers (2) eingesetzt ist, dass eine Öffnung (4) in dem Zentrum der Ausgangswelle (1) und ein Schlitz (5) an dem Ende der Ausgangswelle (1) angeordnet sind, dass eine Feder (6) und eine Riegelachse (7) in der Öffnung (4) angeordnet sind, dass zwei feststehende Riegel (8) in dem Schlitz (5) angeordnet sind, wobei die zwei festen Riegel (8) sich zu zwei Seiten des Schlitzes (5) hin erstrecken und in einen Schlitz (9) eingesetzt sind, der an der Wand der Verbindungsöffnung (4) angeordnet ist, wobei die Riegelachse (7) mit den zwei festen Riegeln (8) über einen Zapfen (10) verbunden ist.
3. Wechsellvorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Vorrichtung ferner aufweist eine polygonale Blindöffnung (16), die auf dem Scheibenträger (2) angeordnet ist; eine Basisplatte (17), wobei die äußere Form der Basisplatte (17) zu der polygonalen Blindöffnung (16) passt; vier Positionierungsöffnungen (18), die in der Basisplatte (17) angeordnet sind; eine vordere Stütze (19) und eine hintere Stütze (20), die in die Positionierungsöffnungen (18) respektive eingesetzt und durch Schrauben (21) befestigt sind, die sich durch die Positionierungsöffnungen (18) erstrecken; einen Schlitz (22), der an dem oberen Teil der vorderen Stütze (19) angeordnet ist; einen Schlitz (23), der an dem oberen Teil der hinteren Stütze (20) angeordnet ist; gerippte Scheiben (25) konkave Form, die auf einer linken Schale (24) und einer rechten Schale (26) angeordnet sind, wobei die vordere Stütze (19) und die hintere Stütze (20) in die gerippten Scheiben (25) der linken Schale (24) bzw. der rechten Schale (26) eingesetzt sind, wobei die vordere Stütze (19) und die hintere Stütze (20) durch die rechte Schale (27) bzw. die linke Schale (24) zusammengefügt und befestigt sind.
4. Wechsellvorrichtung nach Anspruch 1 oder 2, ferner **gekennzeichnet durch** eine Blindöffnung (28), die auf dem Scheibenträger (27) angeordnet ist, wobei der Durchmesser der Blindöffnung (28) größer ist als die externe Größe der Basisplatte (17); und **durch** eine Antriebseinrichtung, die zwischen dem Scheibenträger (27) und der Ausgangswelle (1) angeordnet ist.
5. Wechsellvorrichtung nach Anspruch 4, **dadurch gekennzeichnet, dass** eine taillierte Öffnung (29) in der Mitte des Scheibenhalters (27) angeordnet ist,

und dass eine taillierte Schulter (30), die zu der taillierten Öffnung (29) passt, an dem unteren Teil der Ausgangswelle (1) angeordnet ist.

6. Wechsellvorrichtung nach einem der vorhergehenden Ansprüche, ferner **gekennzeichnet durch** eine Stellschraube (11), wobei die Stellschraube (11) mit dem oberen Teil der Öffnung (4) über ein Gewinde verbunden ist; und **durch** eine Begrenzungsbuchse (12), die in der Öffnung (4) angeordnet ist, wobei der untere Teil der Begrenzungsbuchse (12) auf der Oberfläche der festen Riegel (8) angeordnet ist.
7. Wechsellvorrichtung nach einem der vorhergehenden Ansprüche, ferner **gekennzeichnet durch** einen Schlitz (13), der an dem unteren Teil der Riegelachse (7) angeordnet ist, wobei die beiden festen Riegel (8) in den Schlitz (5) und den Schlitz (13) eingeführt sind und mit der Riegelachse (7) über einen Zapfen (10) verbunden sind.
8. Wechsellvorrichtung nach Anspruch 7, **dadurch gekennzeichnet, dass** eine Endabdeckung (14) an dem unteren Teil der Riegelachse (7) angeordnet ist.
9. Wechsellvorrichtung nach einem der vorhergehenden Ansprüche, ferner **dadurch gekennzeichnet, dass** eine Begrenzungseinrichtung zwischen der äußeren Oberfläche der Riegelachse (7) und der Öffnung (4) angeordnet ist, die an dem unteren Teil der Ausgangswelle (1) liegt.
10. Wechsellvorrichtung nach Anspruch 9, **dadurch gekennzeichnet, dass** die Begrenzungseinrichtung eine Stufenoberfläche (15) aufweist, die an der Außenfläche der Riegelachse (7) liegt, wobei der obere Teil der Stufenfläche (15) größer als der untere Teil der Stufenfläche (15) ist; und dass die Stufenfläche (15) der äußeren Oberfläche der Riegelachse (17) entspricht, die auf der Öffnung (4) ausgebildet ist.

Revendications

1. Dispositif d'échange du support de disque d'une perceuse, ledit dispositif comprenant une tige de sortie et un support de disque, **caractérisé par** un dispositif de blocage (6, 7, 8) situé dans la tige de sortie (1) et qui peut être actionné dans une position de rétraction dans laquelle il est disposé à l'intérieur de la tige de sortie (1) et dans une position étendue dans laquelle il s'étend au-dessus de la périphérie de la tige de sortie (1) et dans un évidement (9) dans le support de disque (2).

2. Dispositif d'échange comme revendiqué dans la revendication 1, **caractérisé en ce que** ladite tige de sortie (1) est introduite dans un trou de connexion (3) dudit support de disque (2), un trou (4) étant situé au centre de ladite tige de sortie (1) et une fente (5) étant positionnée à l'extrémité de ladite tige de sortie (1), un ressort (6) et un axe de blocage (7) étant disposés dans ledit trou (4), les deux blocages (8) étant disposés dans ladite fente (5), lesdits blocages (8) s'étendant vers les deux côtés de ladite fente (5) et étant insérés dans une fente (9) située sur la paroi dudit trou de connexion (3), ledit axe de blocage (7) étant connecté avec lesdits blocages (8) par une tige (10). 5
3. Dispositif d'échange comme revendiqué dans les revendications 1 ou 2, **caractérisé en ce que** ledit dispositif comprend un trou borgne polygonal (16) situé sur ledit support de disque (2), une plaque de logement (17), la forme externe de ladite plaque de logement (17) correspondant avec ledit trou borgne polygonal, quatre trous de positionnement situés sur ladite plaque de logement (17), un support frontal (19) et un support arrière (20) étant introduit dans lesdits trous (18) de positionnement, une fente (22) située sur la partie supérieure dudit support frontal (19), une fente (23) située sur la partie supérieure dudit support arrière (20), des plaques nervurées (25) avec situés de façon concave sur une enveloppe gauche (24) et une enveloppe droite (26), ledit support frontal (19) et le support (20) arrière étant introduits dans lesdites plaques rainurées (25) de ladite enveloppe gauche (24) et d'une enveloppe droite (26), respectivement, ledit support frontal (19) et support arrière (20) étant assemblés et fixés par ladite enveloppe droite (26) et ladite enveloppe gauche (24), respectivement. 10 15 20 25 30 35
4. Dispositif d'échange comme revendiqué dans la revendication 1 ou 2, **caractérisé par** un trou borgne (28) disposé sur un support de disque (27), le diamètre dudit trou borgne (28) étant plus large que la taille extérieure de ladite plaque de logement (17), un dispositif de conduite disposé entre ledit support de disque et ladite tige de sortie (1). 40 45
5. Dispositif d'échange comme revendiqué dans la revendication 4, **caractérisé en ce qu'un** trou (29) cintré est situé au centre dudit support de disque (27) et une épaulement (30) cintré correspondant avec ledit trou (29) cintré étant située sur la partie inférieure de ladite tige de sortie (1). 50
6. Dispositif d'échange selon une quelconque des revendications précédentes, **caractérisé en outre, par** une vis d'ajustement (11), ladite vis d'ajustement (11) étant connectée avec la partie supérieure dudit trou (4) par une vis, un manchon (12) de retenu disposé dans ledit trou (4) et la partie inférieure dudit manchon de retenu (12) étant située sur la surface supérieure desdits blocages (8). 55
7. Dispositif d'échange comme revendiqué dans n'importe laquelle des revendications précédentes, **caractérisé par** une fente (13) située dans la partie inférieure dudit axe de blocage (7), les deux blocages (8) étant introduits dans ladite fente (5) et ladite fente (13) et connecté avec ledit axe de blocage (7) par une tige (10). 5 10
8. Dispositif d'échange comme revendiqué dans la revendication 7, **caractérisé en outre, en ce que** un dispositif de retenu est disposé entre la surface extérieure de l'axe de blocage (7) et ledit trou (4) situé sur la partie inférieure de ladite tige de sortie (1). 15
9. Dispositif d'échange comme revendiqué dans n'importe laquelle des revendications précédentes, **caractérisé en ce que** un dispositif de retenu est situé entre la surface extérieure de l'axe de blocage (7) et ledit trou (4) situé sur la partie inférieure de ladite tige de sortie (1). 20 25
10. Dispositif d'échange comme revendiqué dans la revendication 9, **caractérisé en ce que** ledit dispositif de retenu comprend une surface à gradin située sur la surface extérieure dudit axe central (7), la partie supérieure de ladite surface à gradin (15) étant plus large que la partie inférieure de ladite surface à gradin (15), et une surface à gradin (15) correspondant à la surface extérieure dudit axe central (7) étant réalisée sur ledit trou (4). 30 35

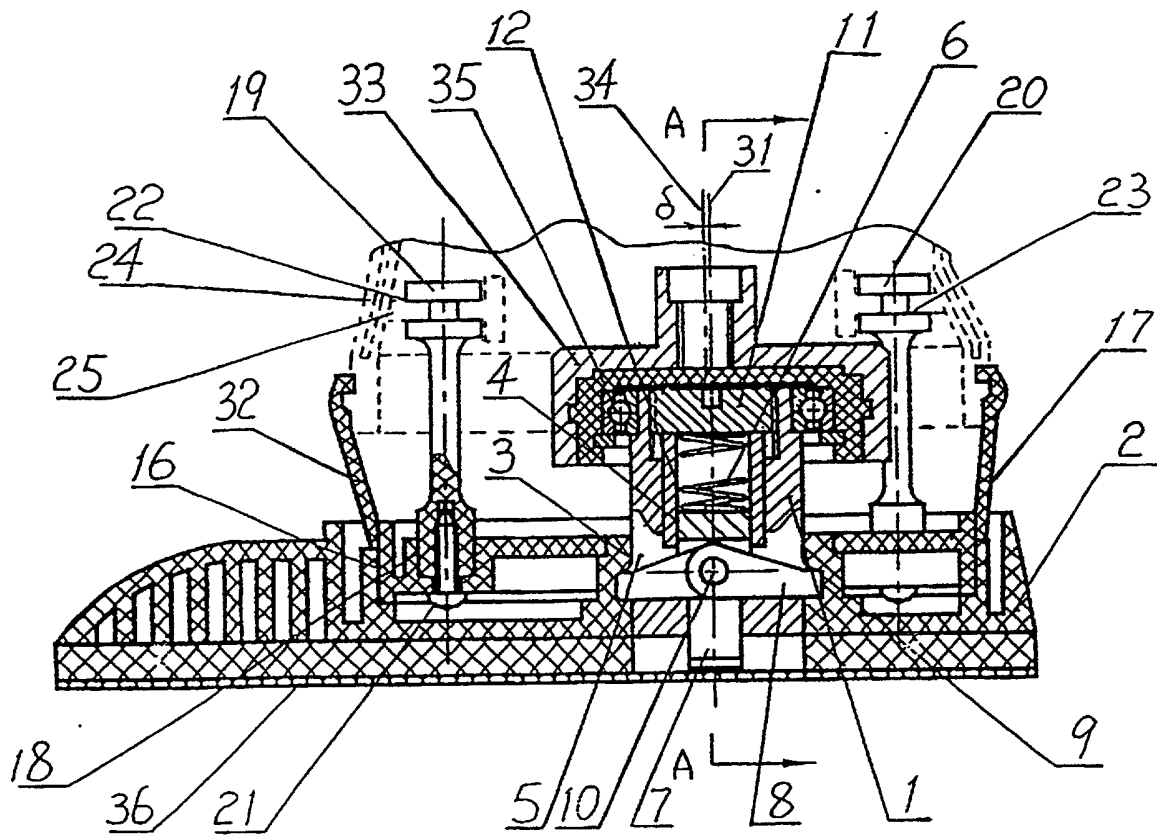


Fig. 1

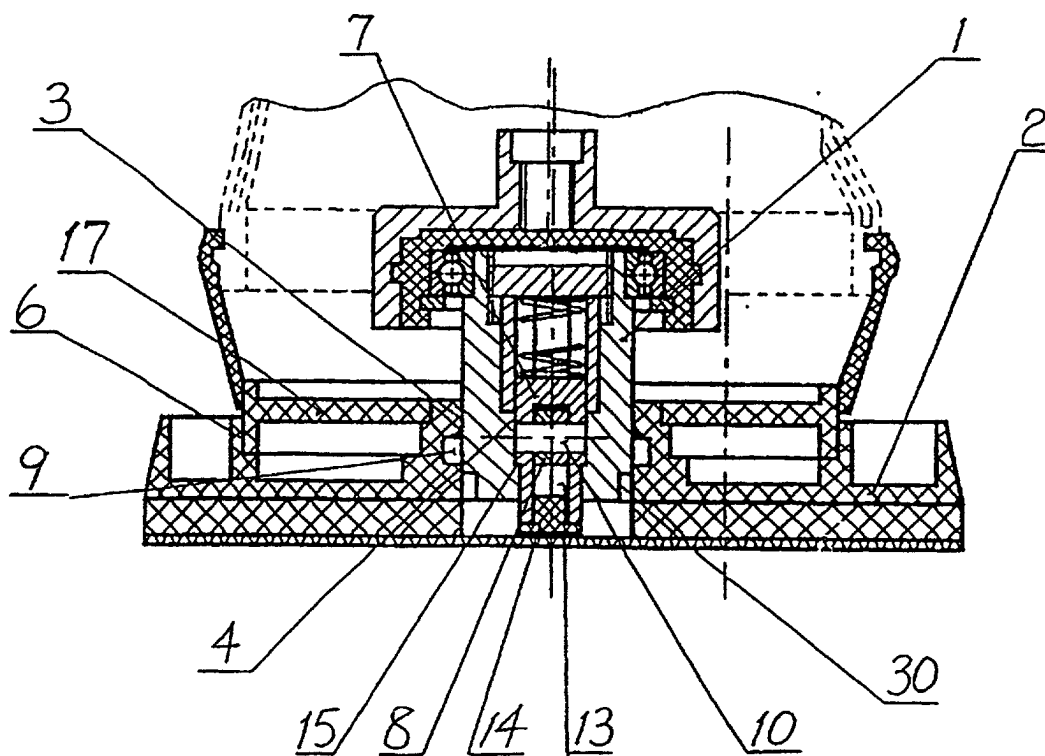


Fig. 2

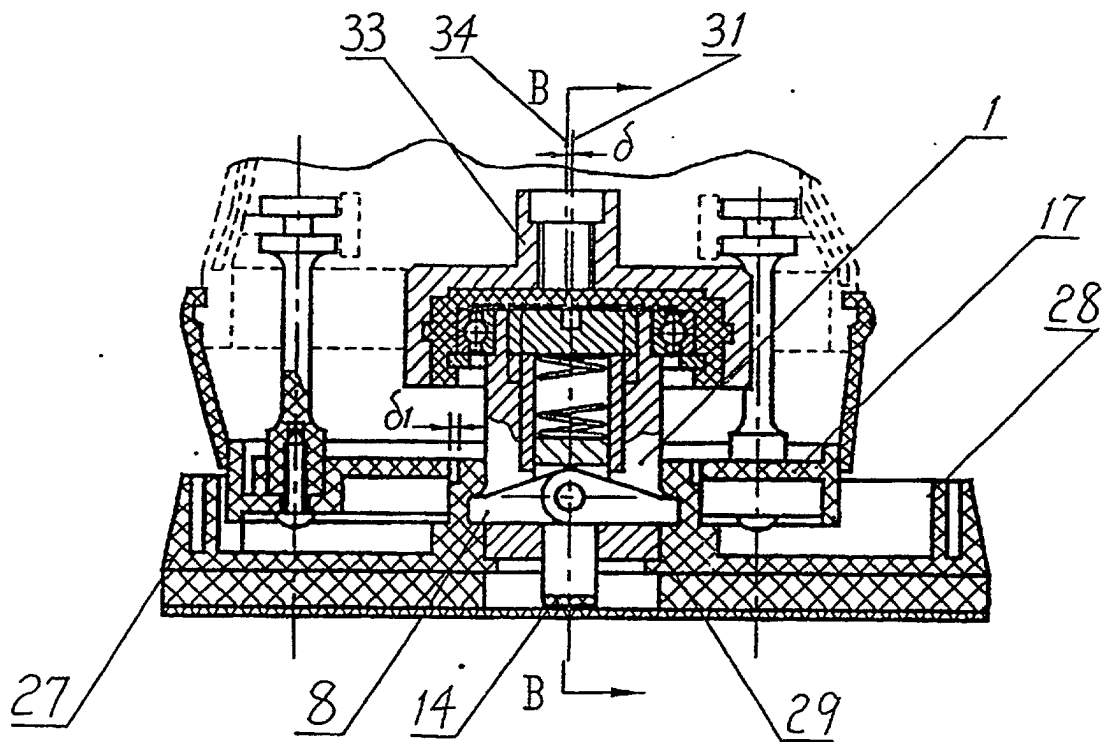


Fig. 3

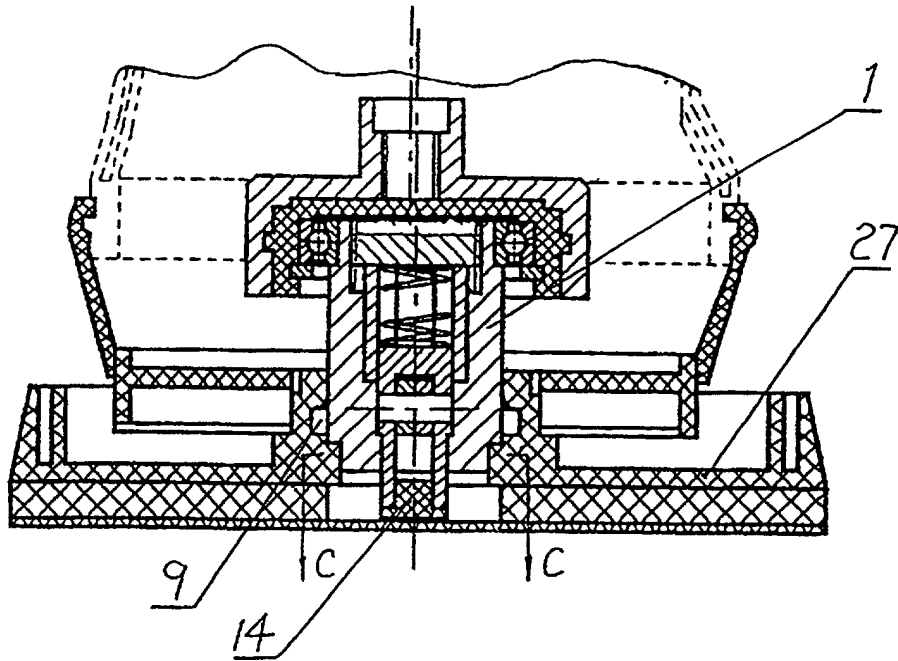


Fig. 4

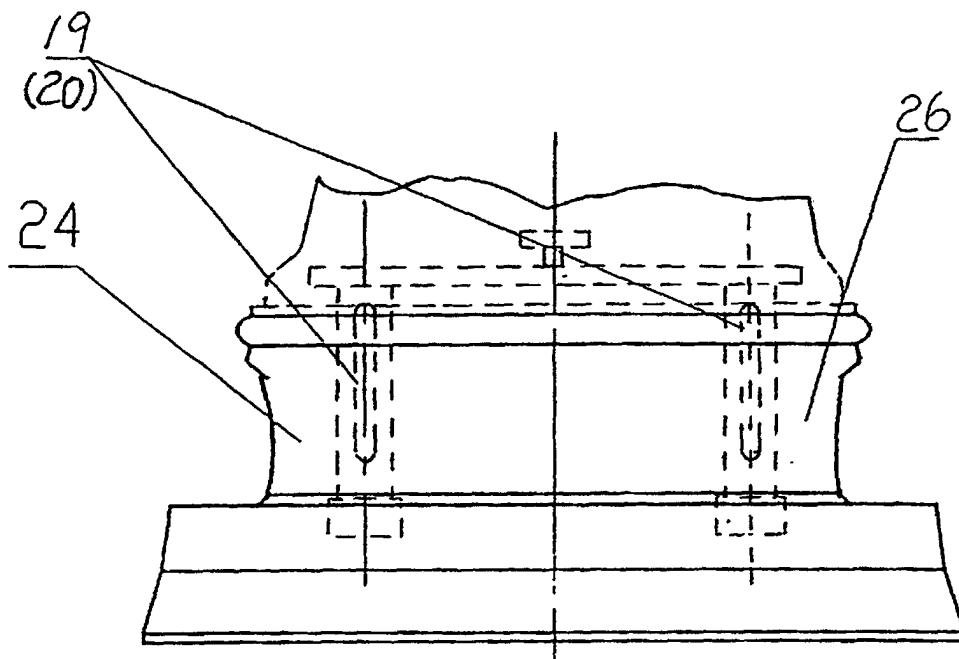


Fig. 5

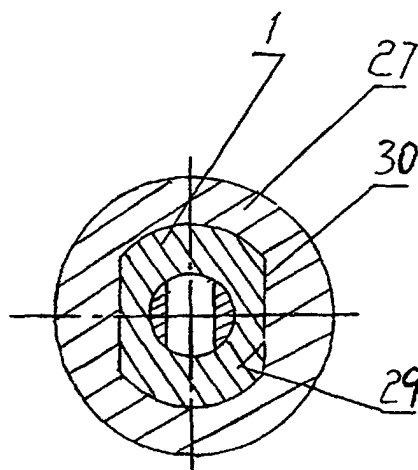


Fig. 6