A gearbox of an electrical drill is disclosed. The drill has a main shaft and the gear box comprises a torque mechanism having an adjusting element mounted onto the main shaft and a driving element mounted within the housing, a plurality of pegs being slide-mounted onto the adjusting element and the rotating housing linked to the adjusting element to provide a displacement and the plurality of pegs engaged with the driving element to prohibit the driving element from rotating; and a vibration switching mechanism having a switching element mounted onto the main shaft and a pad mounted within the rotating housing inserted with two pegs, and the rotating housing being capable of driving the pad to rotate the switching element, and the switching element matched with the securing peg so that the main shaft has an axial displacement.
GEAR BOX OF AN ELECTRICAL DRILL

BACKGROUND OF THE INVENTION

(a) Technical Field of the Invention

The present invention relates to gear box, and in particular, gear box of an electrical drill which allows the rotating of the housing to cause the main shaft to output a maximum torque and axial momentum.

(b) Description of the Prior Art

Portable drills are commonly used in drilling holes or in tightening screws and other applications, as their sizes are normally small. Currently available drills in the market are drills with a motor to provide power to the drills. The power from the motor is exerted onto the internal gear via the planetary gears and is amplified. The internal gear is positioned by a plurality of protrusions on the end face thereof and the hole on the housing mounted with a plurality of beads. When spring exerts a force onto the beads, the torque drives the internal gears, and due to the variations of force exerted by the spring, the internal gears are idle and accordingly, different sizes of torque are output.

When a maximum torque is required, the output torque of the gearbox is locked such that the internal gears will not be idle and ensure that the rotational energy can be output. However, the current drill has a hollow internal gear and the inner wall of the internal gear has a plurality of inner ring gear having one end being block face with a plurality of protrusions. The block face provides change of gear. Further, a gear plate is a planetary gear for engagement with the internal gear, and a housing holds the internal gear and at one lateral side. The other side of the housing holds the gears and when a force is exerted, the gears are prevented from moving from one block face to another. This will prevent the internal gear from sliding becoming idle.

However, when the drills meets a hard surface, the output shaft does not have a vibration function, the motor will become idle if the gears are dislocated, and therefore, the power of motor is exhausted on the internal gear, and the output shaft does not absorb power, and the kinetic energy cannot be fully output.

In view of the above, it is an object of the present invention to provide a gearbox of an electrical drill, which mitigates the above drawback.

SUMMARY OF THE INVENTION

The primary purpose of the present invention is to provide a gear box of an electrical drill having a main shaft and a rotating housing, which comprises a torque mechanism having an adjusting element mounted onto the main shaft and a driving element mounted within the housing, a plurality of pegs being slide-mounted onto the adjusting element and the rotating housing linked to the adjusting element to provide a displacement and the plurality of pegs engaged with the driving element to prohibit the driving element from rotating; and a vibration switching mechanism having a switching element mounted onto the main shaft and a pad mounted within the rotating housing inserted with two pegs, and the rotating housing being capable of driving the pad to rotate the switching element, and the switching element matched with the securing peg so that the main shaft has an axial displacement.
invention. Various changes to the described embodiments may be made in the function and arrangement of the elements described without departing from the scope of the invention as set forth in the appended claims.

[0021] Referring to FIGS. 1 and 2, there is shown a gearbox of an electrical drill having a main shaft 1 and a torque mechanism 2, which generates the maximum torque and a vibration switching mechanism 3, which causes the main shaft 1 to generate a momentum. The main shaft 1 drills a work piece.

[0022] The torque mechanism 2 and the vibration mechanism 3 are provided between the rotating housing 4 and the housing body 5.

[0023] In accordance with the present invention, the torque mechanism 2 includes an adjusting element 21 and a driving element 22, and the adjusting element 21 is provided with a plurality of pegs 211. The surface edge of the adjusting element 21 is threaded sections 212, 41 that can engage with the inner edge of the rotating housing 4. In addition, the surface edge of the driving element 22 is provided with a plurality of engaging slots 221.

[0024] The vibration switching mechanism 3 includes a pad 31 and a switching element 32. The pad 31 is provided with a plurality of engaging slots 311 which are engaged with the protrusion 42 at the inner edge of the housing 4. The inner edge of the pad 31 is provided with a plurality of engaging block 312. The switching element 32 is formed from a first switching ring 321 and a second switching ring 322. One side face of the first switching ring 321 is provided with engaging slot 3211 corresponding to the engaging block 312 of the pad 31. The other side face of the first switching ring 321 is provided with a plurality of engaging slots 3212, and the second switching ring 322 is provided with an engaging block 3221 which is corresponding to the engaging slot 3212 of the first switching ring 321 such that the second switching ring 322 is engaged with the engaging slot 3212 of the first switching ring 321. Accordingly, the drill of the present invention is obtained.

[0025] Referring to FIGS. 3 and 4, there is shown the torque mechanism, before and after, in accordance with the present invention. Before the torque mechanism 2 is adjusted, the plurality of the pegs 211 of the adjusting element 21 is at an empty state. When the rotating housing 4 is rotated, the threaded section 41 drives the adjusting element 21 to displace, and at the same time, the peg 211 is engaged with the engaging slot 221 of the driving member 22.

[0026] At this point, the motor (not shown) provides a maximum torque which is transmitted to the main shaft 1 by the driving member 22, and at the same time, the driving member 22 is prevented from sliding.

[0027] Referring to FIGS. 5A, 5B, 6A and 6B, there is shown the vibration switching mechanism, before and after the action thereof in accordance with the present invention. The housing body 5 is provided with two eccentrically mounted pegs 51 such that when the user drives the rotating housing 4 the pad 31 drives the switching element 32 to rotate. In addition, the second switching ring 322 is a side surface provided with a cavity 222, thus, when the switching element 32 is rotated to the specific position by means of the rotating housing 4, the second switching ring 322 is inter-linked the switching element 32 and with the main shaft to displace axially. After the main shaft, 1 is moved inwardly and positioned, i.e., when the motor transmits the main shaft 1 to rotate the main shaft 1, by means of the top and bottom ratchet wheels (not shown) to mutually slide with each other, the top ratchet wheel will slide and push the main shaft 1 to move axially. Thus, the main shaft 1 generates an impact force to drill a hard surface.

[0028] It will be understood that each of the elements described above, or two or more together may also find a useful application in other types of methods differing from the type described above.

[0029] While certain novel features of this invention have been shown and described and are pointed out in the annexed claim, it is not intended to be limited to the details above, since it will be understood that various omissions, modifications, substitutions and changes in the forms and details of the device illustrated and in its operation can be made by those skilled in the art without departing in any way from the spirit of the present invention.

I claim:

1. A gearbox of an electrical drill having a main shaft and a rotating housing, which comprises a torque mechanism having an adjusting element mounted onto the main shaft and a driving element mounted within the housing, a plurality of pegs being slide-mounted onto the adjusting element and the rotating housing linked to the adjusting element to provide a displacement and the plurality of pegs engaged with the driving element to prohibit the driving element from rotating; and

a vibration switching mechanism having a switching element mounted onto the main shaft and a pad mounted within the rotating housing inserted with two pegs, and the rotating housing being capable of driving the pad to rotate the switching element, and the switching element matched with the securing peg so that the main shaft has an axial displacement.

2. The gearbox of claim 1, wherein the adjusting element is threaded with the rotating housing.

3. The gearbox of claim 1, wherein the surface edge of the driving element is provided with a plurality of engaging slots for securing a plurality of pegs.

4. The gear box of claim 1, wherein the rotating housing is provided with a plurality of protrusions, and the pad is provided with a plurality of engaging slots, and the protrusions are engaged with the engaging slot such that the rotating housing will drive the pad to rotate.

5. The gear box of claim 1, wherein the inner edge of the pad is provided with a plurality of engaging block and the switching element is provided with engaging slot corresponding to the engaging block such that the pad drives the switching element to rotate.

6. The gear box of claim 1, wherein the switching element is formed from a first switching ring and a second switching ring, and the second switching ring is provided with a cavity, thereby when the switching element rotates to an appropriate position, the cavity matches with the securing peg.

7. The gear box of claim 6, wherein the first switching ring is provided with an engaging slot and the second switching ring is provided with a corresponding engaging block, and the engaging block of the second switching ring is engaged and mounted at the engaging slot of the first switching ring.

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