WALL LEVELING ASSEMBLY AND INSTALLATION METHOD

TECHNICAL FIELD

The present disclosure relates to the technical field of wall decoration, and more specifically, to a wall leveling assembly and an installation method.

BACKGROUND

In the field of interior decoration, wall decoration is a key area for building interior space decoration. Wall decoration can protect the wall, enhance the robustness and durability of the wall, and extend the service life of the wall. It can also improve the function of the wall, such as improving the wall's thermal insulation, heat insulation and sound insulation capabilities, improving the artistic effect of the building, and beautifying the environment.

Technical Problem

Wall leveling is an important part of wall decoration. The flatness after leveling directly affects the installation of subsequent finishes. The existing wall leveling generally includes the following:

The first type is to use cement mortar to level, then plastering is implemented for further leveled. This technique is more commonly used in traditional decoration, and the technology is relatively mature. However, the process is difficult, the working hours are long, and the material consumption is high. The wall pipeline needs to be grooved on site, which cannot be make the pipeline separated.

The second type uses wooden vertical keel leveling. Although it can meet the requirements of pipeline separation, it requires high proficiency for the installation workers, and the wooden vertical keel needs to be treated with anti-corrosion and fire protection. The construction steps are more complicated and the degree of integration is not high.

The third type is to use the light steel vertical keel and U-shaped vertical keel clamp for leveling and dry operation, to meet the pipeline separation requirements. However, the adjustment of the flatness is not easy to control and the installation is more complicated.

SUMMARY

Technical Solutions

To this end, there is a need for a wall leveling assembly and an installation method to solve the above problems.

In view of this, the purpose of the present disclosure is to provide a wall leveling assembly and an installation method. The leveling assembly is used in conjunction with the keel subassembly to achieve the leveling of the wall, and improve the leveling accuracy with simple installation steps. It can reduce assembly difficulty and improve installation efficiency.

Based on the above purpose, the present disclosure provides a wall leveling assembly, which includes:

a keel subassembly, the keel subassembly includes a sky keel, a ground keel arranged oppositely to each other, and a plurality of vertical keels that may be connected between the sky keel and the ground keel and may be distributed in sequence; the sky keel and the ground keel may be respectively connected with the upper part and the lower part of the wall; each of the vertical keels may be provided with a plurality of mounting holes spaced apart along the length direction;

leveling subassemblies, each leveling subassembly may be installed at a corresponding position of each mounting hole, the leveling subassembly may include a support seat and a leveling screw. The support seat may be used to detachably connect with the vertical keel, and may be provided with a first through hole penetrating in the thickness direction and may be arranged opposite to the mounting hole. The inner wall of the first through hole may be provided with a plurality of first thread sections spaced and evenly distributed in the circumferential direction. A leveling prompt portion may be provided between two adjacent first thread sections. A second through hole penetrating in the thickness direction may be provided on the leveling screw, and the outer wall of the leveling screw is provided with a plurality of second thread sections spaced and evenly distributed in the circumferential direction, the second thread section can be used in conjunction with the first thread section. The leveling screw can move along the

first through hole, and one end surface of the leveling screw located in the first through hole can be flush with the leveling prompt portion.

Preferably, the vertical keel may include a first support plate and first side plates extending from opposite sides of the first support plate along a same direction. Two first side plates and the first support plate may enclose to form a first receiving groove for receiving the support seat. A plurality of the mounting holes may be all provided on the first support plate; the opposite side walls of the support seat may be provided with elastic clip. The first side plate may be provided with a card slot that cooperates with the elastic clip and corresponds to each other.

Preferably, a limit baffle may be provided on the same side edge of each of the first thread sections, and the limit baffle may extend obliquely upwards of the first thread section, so that the second thread section can rotate within a preset range according to a preset direction on the first thread section.

Preferably, the sky keel may include a second support plate and second side plates extending from the opposite sides of the second support plate along a same direction, and the second support plate may be provided with a plurality of first fixing holes spaced along the length direction.

In addition, preferably, the ground keel may include a third support plate and a third side plate and a fourth side plate respectively extending from opposite sides of the third support plate along a same direction. The length of the third side plate may be greater than the length of the fourth side plate. The third side plate, the fourth side plate and the third support plate may enclose to form a second receiving groove for receiving the vertical keel. The third side plate may be provided with a plurality of second fixing holes arranged at intervals along the length direction.

The present disclosure also provides a method for installing the wall leveling assembly as described above, including:

(1) providing a base layer starting position mark and a base layer finish surface mark on the wall and the surroundings of the area to be installed; dividing the wall into assembly area and/or other area according to the base layer starting position mark;

(2) installing the keel subassembly in the assembly area, and making the edge of the keel

subassembly coincide with the base layer finish surface mark; wherein the plurality of vertical keels may be connected between the sky keel and the ground keel at intervals, a support seat may be installed in the mounting hole of each vertical keel, and the sky keel and the ground keel may be respectively connected to the upper part and the lower part of the wall;

(3) inserting the leveling screw into the first through hole of the support seat and moving along the first through hole until the end surface of the leveling screw located outside the first through hole abuts the wall, and the end surface of the leveling screw located in the first through hole can be arranged flush with the leveling prompt portion; driving the leveling screw to rotate within a preset range, so that the first thread section is threadedly connected with the second thread section;

(4) fixing the leveling screw on the wall with fixing members;

(5) repeating Steps (3) and (4) until the leveling screw is installed in each support seat;

(6) installing at least one vertical keel in the other area, installing a support seat in the mounting hole of each vertical keel, and connecting both ends of the vertical keel to the wall; repeating Steps (3) and (4) until the leveling screw is installed in each support seat.

Preferably, the vertical keel may include a first support plate and first side plates extending from opposite sides of the first support plate along a same direction. Two first side plates and the first support plate may enclose to form a first receiving groove for receiving the support seat. The plurality of the mounting holes may be all provided on the first support plate; the opposite side walls of the support seat may be provided with elastic clip. The first side plate may be provided with a card slot that cooperates with the elastic clip and corresponds to each other. In Step (2), it further includes: installing the support seat in the first receiving groove, two elastic clips of the support seat may be respectively engaged with the card slots on the two first side plates.

Preferably, a limit baffle may be provided on the same side edge of each of the first thread sections, and the limit baffle may extend obliquely upwards of the first thread section, so that the second thread section can rotate within a preset range according to a preset direction on the first thread section. Step (3) further includes: blocking the reverse rotation of the leveling screw by each of the limit baffles when the leveling screw is inserted into the first through hole; limiting

the rotation range of the leveling screw by the plurality of limit baffles.

Preferably, the sky keel may include a second support plate and second side plates extending from the opposite sides of the second support plate along a same direction, and the second support plate may be provided with a plurality of first fixing holes spaced along the length direction. Step (2) may further include: setting the top ends of a plurality of the vertical keels distributed at equal intervals in sequence along the extension direction of the second support plate, and abutting each vertical keel against the wall; extending the second side plate to a side away from the first receiving groove, and using a first fixing member to penetrate the first fixing hole and being fixed to the upper part of the wall.

Preferably, the ground keel may include a third support plate and a third side plate and a fourth side plate respectively extending from opposite sides of the third support plate along a same direction. The length of the third side plate may be greater than the length of the fourth side plate. The third side plate, the fourth side plate and the third support plate may enclose to form a second receiving groove for receiving the vertical keel. The third side plate may be provided with a plurality of second fixing holes arranged at intervals along the length direction. Step (2) may further include: abutting the third support plate against the ground, abutting the fourth side plate against the lower part of the wall; inserting the bottom ends of the plurality of the vertical keels into the second receiving groove, and distributing at equal intervals along the extension direction of the second receiving groove; using a second fixing member to penetrate the second fixing hole, and fixing with the lower part of the wall.

Beneficial Effect

It can be seen from the above that, compared with the prior art, the wall leveling assembly and installation method provided by the present disclosure have the following advantages: the two ends of the vertical keel are respectively connected with the sky keel and the ground keel, the sky keel and the ground keel are respectively connected to the upper part of and the lower part of the wall, so that the vertical keel is arranged opposite to the wall. The decorative layer can be installed on the wall through the vertical keel, which reduces the assembly difficulty and improves the assembly speed. The support seat and vertical keel are used in conjunction, and then leveling screw is screwed into the first through hole of the support seat, and by adjusting the

insertion depth of the leveling screw, effective support can be provided for the vertical keel, maintaining the vertical extension of the vertical keel, and realizing the leveling of the vertical keel relative to the wall, the same support height for the decorative layer installed above the vertical keel can be provided. The support seat and the leveling screw may be connected by threads to improve leveling accuracy. Moreover, the first thread section and the second thread section both adopt a semi-thread structure, the rotation angle can be limited to avoid excessive adjustment and ensure the stability of the connection. Before leaving the factory, the support seat can be installed on the vertical keel, and only the installation and positioning of the leveling screw need to be completed at the construction site, and the installation steps may be simple, to reduce the difficulty of assembly and increase the speed of installation.

DESCRIPTION OF THE DRAWINGS

Through the following description of the embodiments thereof combining with the accompanying drawings, the above-mentioned features and technical advantages of the present disclosure will become clearer and easier to understand.

FIG. 1 is a schematic diagram of a wall leveling assembly used in a specific embodiment of the present disclosure.

FIG. 2 is a partial schematic diagram of the keel subassembly of the wall leveling assembly shown in FIG. 1.

FIGS. 3a to 3e are schematic diagrams of the sky keel of the keel subassembly shown in FIG. 2.

FIGS. 4a to 4e are schematic diagrams of the ground keel of the keel subassembly shown in FIG. 2.

FIGS. 5a to 5e are schematic diagrams of the vertical keel of the keel subassembly shown in FIG. 2.

FIGS. 6a to 6c are schematic diagrams of the leveling subassembly of the wall leveling assembly shown in FIG. 1.

FIGS. 7a to 7f are schematic diagrams of the support seat of the leveling assembly shown in FIG. 6a.

FIGS. 8a-8e are schematic diagrams of the leveling screw of the leveling assembly shown in FIG. 6a.

FIGS. 9a to 9h are schematic diagrams of the installation process of the wall leveling assembly of the leveling subassembly shown in FIG. 1.

wherein:

10: support seat; 11: first through hole; 12: first thread section; 13: leveling prompt portion; 14: limit baffle; 15: first smooth surface; 16: first reinforcing rib; 17: guide surface; 18: elastic clip; 20: leveling screw; 21: second through hole; 22: second thread section; 23: second smooth surface; 24: second reinforcing rib; 30: keel subassembly; 31: sky keel; 32: ground keel; 33: vertical keel; 34: fixing screw; 40: wall.

DETAILED DESCRIPTION OF THE EMBODIMENTS

In order to make the objectives, technical solutions and advantages of the present disclosure clearer, the present disclosure will be further described in detail below in conjunction with specific embodiments and with reference to the accompanying drawings. The same parts are indicated by the same reference numerals. It should be noted that the words "front", "rear", "left", "right", "upper" and "lower" used in the following description refer to the directions in the drawings. The words "inner" and "outer" are used to refer to directions toward or away from the geometric center of a particular part, respectively.

FIG. 1 is a schematic diagram of a wall leveling assembly used in a specific embodiment of the present disclosure. FIG. 2 is a partial schematic diagram of the keel subassembly of the wall leveling assembly shown in FIG. 1. FIGS. 3a to 3e are schematic diagrams of the sky keel of the keel subassembly shown in FIG. 2, wherein, FIG. 3a is a schematic diagram of the sky keel of the keel subassembly shown in FIG. 2; FIG. 3b is a side view of the sky keel of the keel subassembly shown in FIG. 3a; FIG. 3c is a partial enlarged view of the Part d of the sky keel of the keel subassembly shown in FIG. 3a. FIG. 3d is a partial enlarged view of the sky keel of the keel subassembly shown in FIG. 3a; FIG. 3e is a partial enlarged view of Part a of the keel subassembly shown in FIG. 3a. FIGS. 4a to 4e are schematic diagrams of the ground keel of the keel subassembly shown in FIG. 2. FIG. 4a is a schematic diagram of the ground keel of the keel

subassembly shown in FIG. 2; FIG. 4b is a side view of the ground keel of the keel subassembly shown in FIG. 4a; FIG. 4c is a partial enlarged view of Part e of the sky keel of the keel subassembly shown in FIG. 4a. FIG. 4d is a partial enlarged view of the ground keel of the keel subassembly shown in FIG. 4a; FIG. 4e is a partial enlarged view of Part b of the keel subassembly shown in FIG. 4a. FIGS. 5a to 5e are schematic diagrams of the vertical keel of the keel subassembly shown in FIG. 2, wherein, FIG. 5a is a schematic diagram of the vertical keel of the keel subassembly shown in FIG. 2; FIG. 5b is a partial enlarged view of Part c of the vertical keel of the keel subassembly shown in FIG. 5a; FIG. 5c is a schematic diagram of the connection state of the vertical keel and the support seat of the keel subassembly shown in FIG. 5a; FIG. 5d is a side view of the connection state of the vertical keel and the support seat of the keel subassembly shown in FIG. 5a; FIG. 5e is a partial enlarged view of the connection state of the vertical keel and the support seat of the keel subassembly shown in FIG. 5a. FIGS. 6a to 6c are schematic diagrams of the leveling subassembly of the wall leveling assembly shown in FIG. 1, wherein FIG. 6a is a schematic diagram of the leveling subassembly of the keel subassembly shown in FIG. 1; FIG. 6b is a side view of the leveling subassembly of the keel subassembly shown in FIG. 6a; FIG. 6c is another side view of the leveling subassembly of the keel subassembly shown in FIG. 6a. FIGS. 7a to 7f are schematic diagrams of the support seat of the leveling subassembly shown in FIG. 6a, wherein, FIG. 7a is a schematic diagram of the support seat of the leveling subassembly shown in FIG. 6a; FIG. 7b is a side view of the support seat of the leveling subassembly shown in FIG. 7a; FIG. 7c is the support seat of the leveling subassembly shown in FIG. 7a; FIG. 7d is another side view of the support seat of the leveling subassembly shown in FIG. 7a; FIG. 7e is a cross-sectional view of B-B of the support seat of the leveling subassembly shown in FIG. 7d; FIG. 7f is a cross-sectional view of CC of the support seat of the leveling subassembly shown in FIG. 7d. FIGS. 8a-8e are schematic diagrams of the leveling screw of the leveling subassembly shown in FIG. 6a, wherein, FIG. 8a is a schematic diagram of the leveling screw of the leveling subassembly shown in FIG. 6a; FIG. 8b is a side view of the leveling screw of the leveling subassembly shown in FIG. 8a; FIG. 8c is another side view of the leveling screw of the leveling subassembly shown in FIG. 8a; FIG. 8d is a cross-sectional view of DD of the leveling screw of the leveling subassembly shown in FIG. 8c;

FIG. 8e is a cross-sectional view of EE of the leveling screw of the leveling subassembly shown in FIG. 8c. FIG.s 9a to 9h are schematic diagrams of the installation process of the wall leveling assembly of the leveling subassembly shown in FIG. 1.

As shown in the above figures, the wall leveling assembly may include: a keel subassembly 30 and a leveling subassembly.

The keel subassembly 30 may include a sky keel 31, a ground keel 32, and a plurality of vertical keels 33 that may be connected and distributed in sequence between the sky keel 31 and the ground keel 32. The sky keel 31 and the ground keel 32 may be respectively connected to the upper part and the lower part of the wall; each vertical keel 33 may be provided with a plurality of mounting holes spaced apart along the length;

leveling subassemblies, of which each may be installed at the corresponding position of each mounting hole. The leveling assembly may include a support seat 10 and a leveling screw 20. The support seat 10 may be used for detachable connection with the vertical keel 33, and the support seat 10 may be provided with a first through hole 11 along the thickness direction. The inner wall of the first through hole 11 may be provided with a plurality of first thread sections 12 spaced and evenly distributed in the circumferential direction, and a leveling prompt portion 13 may be provided between two adjacent first thread sections 12. The leveling screw 20 may be provided with a second through hole 21 penetrating in the thickness direction. The outer wall of the leveling screw 20 may be provided with a plurality of second thread section 22 spaced in the circumferential direction and used in conjunction with the first thread section 12. The leveling screw 20 can move along the first through hole 11, and the end surface of the leveling screw 20 located in the first through hole 11 can be flush with the leveling prompt portion 13.

The sky keel 31 and the ground keel 32 may be arranged oppositely, and a plurality of vertical keels 33 may be arranged in sequence between the sky keel 31 and the ground keel 32. The two ends of the vertical keel 33 may be respectively connected with the sky keel 31 and the ground keel 32, and the sky keel 31 and the ground keel 32 may be used to connect to the upper part and the lower part of the wall respectively, so that the vertical keel 33 may be arranged opposite to the wall. The decorative layer can be installed on the wall through the vertical keel, which reduces the difficulty of assembly and increases the speed of assembly. The vertical keel

33 may be connected to the support seat 10, the vertical keel 33 may be abutted on the wall, the installation tool may be inserted into the second through hole 21, the leveling screw 20 may be inserted into the first through hole 11 through the mounting hole. The second thread section 22 of the leveling screw 20 may be arranged oppositely to the first smooth surface of the first through hole 11. The first thread section 12 of the first through hole 11 may be arranged oppositely to the second smooth surface of the leveling screw 20, the leveling screw 20 may be pushed to move along the first through hole 11 to the side of the wall until it abuts on the wall. At this time, if the leveling prompt portion 13 is not exposed or is flush with the end surface of the leveling screw 20, the leveling screw 20 can be rotated, such that the first thread section 12 and the second thread section 22 may be threadedly connected, and a fixing member (such as a fixing screw) can be used to install into the second through hole 21, and the leveling screw 20 may be fixed on the wall. If the leveling prompt portion 13 has been exposed, but the leveling screw 20 is still not flush with the wall, the leveling screw 20 may be withdrawn from the first through hole 11, and the leveling screw 20 with a longer length may be replaced and reinstalled. Using the above-mentioned wall leveling assembly, the two ends of the vertical keel may be respectively connected with the sky keel and the ground keel, and the sky keel and the ground keel may be respectively connected with the upper part and the lower part of the wall, so that the vertical keel may be arranged opposite to the wall. The support seat may be used with the vertical keel, and then the leveling screw is screwed into the first through hole of the support seat. By adjusting the insertion depth of the leveling screw, it provides effective support for the vertical keel, to maintain the straight extension of the vertical keel, and realizes the leveling of the vertical keel relative to the wall, and provides the same support height for the decorative layer installed above the vertical keel. The support seat and the leveling screw may be connected by threads to improve the leveling accuracy; and the first thread section and the second thread section may be both half-threaded structure to limit the rotation angle to avoid excessive adjustment, such that the stability of the connection can be ensured. Moreover, the support seat can be installed on the vertical keel before leaving the factory, and only the installation and positioning of the leveling screw need to be completed at the construction site. The installation steps may be simple, it can reduce the difficulty of assembly and improve the installation speed.

Preferably, the vertical keel 33 may include a first support plate and first side plates extending from opposite sides of the first support plate along the same direction respectively. Two first side plates and the first support plate may enclose to form a first receiving groove for receiving the support seat 10. A plurality of mounting holes may be provided on the first support plate; the opposite side walls of the support seat 10 may be provided with elastic clips 18. The first side plate may be provided with a card slot for using in conjunction with and corresponding to each of the elastic clips 18. By providing the elastic clip 18 and the card slot to cooperate with each other, the clamping connection between the support seat 10 and the vertical keel 33 can be realized. Before installation, the support seat 10 and the vertical keel 33 can be installed in advance. When transported to the installation site, only the matching leveling screw 20 needs to be installed, which reduces the transportation difficulty and increases the installation speed.

In this embodiment, the length of the first side plate may be greater than the height of the support seat 10, so that after the support seat 10 is installed, the first receiving groove can still provide installation space for pipeline separation. The free end of the first side plate may be provided with an inner curved portion, and the end surface of the curved portion can provide support for the support seat 10 so as to improve the connection stability of the support seat 10 and the vertical keel 33.

In this embodiment, the elastic clip 18 may be a protrusion extending from the outer wall of the support seat 10, the protrusion may extend along the length direction of the support seat 10, and guide surfaces 17 may be provided on opposite sides of the protrusion 17. The guide surface 17 may be used to guide the protrusion clamped into the card slot. By providing protrusions, the protrusion may be engaged with the card slot of the vertical keel 33. The guide surface 17 can reduce the width of the ends of the protrusions to guide the protrusions into the card slot, such that the difficulty of assembly can be reduced, and the assembly speed may be increased.

In this embodiment, the card slot may be provided with a recess on the opposite side walls of the support seat 10, the elastic clip 18 may be arranged in the recess, and the protrusion may be arranged close to the free end of the side wall. The guide surface 17 may be provided on the convex surface, the guide surface may be approximately trapezoidal, and the length of the bottom side close to the support seat 10 may be greater than the length of the bottom side far

away from the support seat 10.

Preferably, a limit baffle 14 may be provided on the same side edge of each first thread section 12, and the limit baffle 14 may extend obliquely upwards toward the first thread section 12, so that the second thread section 22 can be rotated within a preset range in a preset direction on the first thread section 12. By providing the limit baffle 14, it may be restricted that the leveling screw 20 inserted into the first through hole 11 can only rotate in one direction (such as clockwise) and cannot rotate in the reverse direction. A plurality of limit baffles 14 can limit the rotation range of the leveling screw 20, and it can be rotated forward or reverse within the rotation range, and the rotation range does not exceed 120°, usually 90°, which can avoid the leveling screw 20 from falling out of the first through hole 11, causing connection failure.

In this embodiment, two limit baffles 14 may be provided in the first through hole 11, and each limit baffle 14 may be provided on the edge of the first thread section 12 and connected to the first smooth surface 15 to form a stepped shape.

In this embodiment, the leveling prompt portion 13 may be protrudingly provided on the inner wall of the first through hole 11 and may extend along the circumferential direction of the first through hole 11. The leveling prompt portion 13 may protrude from the inner wall of the first through hole 11 to facilitate the operator to identify the specific location and reduce the difficulty of identification. There may be a certain distance between the leveling prompt portion 13 and the screw-out end of the first through hole 11 to ensure connection strength. The leveling prompt portion 13 may be used to prompt the maximum leveling distance of the leveling screw 20 in the first through hole 11, when the leveling screw 20 is inserted into the first through hole 11, the leveling prompt portion 13 may be occluded by the leveling screw 20. As the leveling screw 20 continues to enter until the leveling screw 20 is flush with the leveling prompt portion 13, the leveling screw 20 may be rotated, so that the first thread section 12 and the second thread section 22 may be threadedly connected, to ensure effective connection strength. If the leveling screw 20 abuts against the wall before the leveling prompt portion 13 appears, the leveling screw 20 and the support seat 10 can be effectively connected. If the leveling screw 20 fails to abut against the wall after the leveling prompt portion 13 appears, it means that the length of the leveling screw 20 cannot meet the requirements, and it needs to be replaced with a leveling

screw 20 with a longer length.

In this embodiment, the distance between the leveling prompt portion 13 and the screw-out end of the first through hole 11 may range from 1/4 to 1/2 of the length of the first through hole 11.

In this embodiment, both the first weight-reducing groove and the second weight-reducing groove may be arranged on the side of the screw-out end. A smooth transition may be formed between the surface of the screw-in end of the support seat 10 and the side wall of the support seat 10.

In order to reduce the installation difficulty and ensure the connection strength, in this embodiment, two first thread sections 12 may be symmetrically distributed on the inner wall of the first through hole 11, and two second thread sections 22 may be symmetrically distributed on the outer wall of the leveling screw 20. The distance between the two first thread sections 12 may be smaller than the diameter of the first through hole 11. The distance between the two second thread sections 22 may be larger than the diameter of the leveling screw 20. The distance between the two first thread sections 12 may match the distance between the two second thread sections 22. There may be a first smooth surface 15 between adjacent first thread sections 12, and a second smooth surface 23 between adjacent second thread sections 22. When the leveling screw 20 is inserted into the first through hole 11 of the support seat 10, the second thread section 22 may be disposed opposite to the first smooth surface 15, the first screw section 12 may be disposed opposite to the second smooth surface 23. When the end surface of the leveling screw 20 located at the first through hole 11 is flush with the leveling prompt portion 13, the leveling screw 20 may be rotated so that the first thread section 12 and the second thread section 22 may be threadedly connected, and the leveling screw 20 and the support seat 10 may be relatively fixed in position.

In this embodiment, the arc of the first thread section 12 may be not greater than the arc of the first smooth surface 15, for example, the first thread section 12 may extend inward from the first smooth surface 15. The distance between the two first thread sections 12 may be not greater than the distance between the two first smooth surfaces 15. The arc of the second thread section 22 may be slightly larger than the arc of the second smooth surface 23, for example, the second

thread section 22 may extend outward from the second smooth surface. The distance between the two second thread sections 22 may be not less than the distance between the two second smooth surfaces 23.

In this embodiment, the support seat 10 may be provided with a first weight-reducing groove extending in the circumferential direction. The first weight-reducing groove may be provided with a plurality of first reinforcing ribs 16 uniformly distributed in the circumferential direction. By providing the first weight-reducing groove, the overall weight of the support seat 10 can be reduced, and the manufacturing cost can be saved. By providing the first reinforcing ribs 16, the structural strength of the support seat 10 and the stability can be improved.

In this embodiment, the first weight-reducing groove may be arranged between the outside of the first through hole 11 and the side wall of the support seat 10, and the plurality of first reinforcing ribs 16 may be evenly distributed in the first weight-reducing groove.

In this embodiment, the leveling screw 20 may be provided with a second weight-reducing groove extending in the circumferential direction, and the second weight-reducing groove may be provided with a plurality of second reinforcing ribs 24 evenly distributed in the circumferential direction. By providing the second weight-reducing groove, the overall weight of the leveling screw 20 can be reduced, and the production cost can be saved. By providing the second reinforcing ribs 24, the structural strength of the leveling screw 20 and the stability can be improved.

In this embodiment, the second weight reduction groove may be arranged between the outside of the second through hole 21 and the side wall of the leveling screw 20, and a plurality of second reinforcement ribs 24 may be evenly distributed in the second weight reduction groove.

In order to reduce the installation difficulty and improve the connection strength, in this embodiment, the second through hole 21 may include a mounting section and a fixing section that may be connected in sequence. The mounting section may be used for inserting installation tools, and the fixing section may be used for mounting the fixing screws. The installation tools may include, but are not limited to, hexagonal wrenches. The fixing screws may include but are not limited to self-tapping screws. The mounting section may be a hexagonal hole for screwing

in or out of a hexagonal wrench. The fixing section may be a countersunk hole for fixing the self-tapping screws.

In this embodiment, the support seat 10 may be made of injection molding materials. The injection molding material has the advantages of good molding effect, light weight, low cost, flexibility, and convenient assembly. The injection molding materials may include but are not limited to ABS, PP, PVC, PC.

Preferably, the sky keel 31 may include a second support plate and second side plates extending from opposite sides of the second support plate along the same direction, respectively. The second support plate may be provided with a plurality of first fixing holes spaced along the length direction. The second support plate may be used for supporting the vertical keel 33, the second side plate may abut the decorative layer. The first fixing hole may be used for installing screws 34, so that the vertical keel 33 is installed and positioned on the wall.

In this embodiment, the sky keel 31 may be extruded from aluminum alloy or rolled by steel plate, and may be a full-length profile. Both the second side plates may extend obliquely to the outside of the second support plate. The first fixing hole may include, but is not limited to, a countersunk hole.

In addition, preferably, the ground keel 32 may include a third support plate and a third side plate and a fourth side plate extending from opposite sides of the third support plate along the same direction. The length of the third side plate may be greater than the length of the fourth side plate. The third side plate, the fourth side plate and the third support plate may be enclosed to form a second receiving groove for receiving the vertical keel 33, and the third side plate may be provided with a plurality of second fixing holes spaced apart along the length hole. The second receiving groove may be used for installing and limiting the vertical keel 33, the fourth side plate may abut against the wall. The second fixing hole may be used for installing screws 34, so that the vertical keel 33 may be installed and positioned on the wall.

In this embodiment, the ground keel 32 may be extruded from aluminum alloy or rolled by steel plate, and may be a full-length profile. The length of the third side plate may be approximately equal to 2 to 3 times the length of the fourth side plate. The second fixing hole may include, but not limited to, a countersunk hole.

The following further introduces the use process of the wall leveling assembly.

The sky keel 31 and the ground keel 32 may be arranged oppositely, a plurality of vertical keels 33 may be arranged in sequence between the sky keel 31 and the ground keel 32. The top end of the vertical keel 33 and the sky keel 31 may be fixed by screws 34, and the bottom end of the vertical keel 33 may be inserted in the second receiving groove of the ground keel 32 and fixed by screws 34. The sky keel 31 and the ground keel 32 may be respectively used to connect with the upper part and the lower part of the wall, so that the vertical keel 33 may be arranged opposite to the wall. The support seat 10 may be connected to the first receiving groove of the vertical keel 33, wherein the elastic clips 18 on the opposite side walls of the support seat 10 may be locked into the grooves on the opposite side walls of the vertical keel 33 one by one. The vertical keel 33 may abut on the wall, an Allen wrench may be inserted into the mounting section of the second through hole 21, and the leveling screw 20 may be inserted into the first through hole 11. The second thread section 22 of the leveling screw 20 may be arranged opposite to the first smooth surface of the first through hole 11. The first thread section 12 of the first through hole 11 may be arranged opposite to the second smooth surface of the leveling screw 20, and the leveling screw 20 may be pushed to move along the first through hole, until it abuts on the wall. At this time, if the leveling prompt portion 13 is not exposed or is arranged flush with the end surface of the leveling screw 20, the leveling screw 20 can be rotated to make the first thread section 12 threadedly connected with the second thread section 22. The limit baffle 14 can limit the leveling screw 20 inserted into the first through hole 11 to rotate only in one direction, and the plurality of limit baffles 14 can define the rotate range of the leveling screw 20 to prevent excessive rotation from falling off the first through hole 11. The self-tapping screws may be adopted to install to the fixing section of the second through hole 21, and the leveling screw 20 may be fixed on the wall. If the leveling prompt portion 13 has been exposed, but the leveling screw 20 does still not abut the wall, the leveling screw 20 may be withdrawn from the first through hole 11, and the leveling screw 20 with a longer length may be replaced and reinstalled.

FIGS. 9a to 9g are schematic diagrams of the installation process of the wall leveling assembly of the leveling subassembly shown in FIG. 1. The present disclosure also provides a method for installing the wall leveling assembly as described above, including:

(1) providing base layer starting position marks and base layer finish surface marks on the wall 40 and the surroundings of the area to be installed; dividing the wall into assembly area and/or other area. The marks may include but are not limited to the indication line provided according to the construction drawings. The base layer starting position marks may be all extended along the height direction of the wall 40, and the base layer finish surface marks may be superimposed on the thickness direction of the wall 40, that is, they are extended along the direction of height and the width direction of the wall 40 respectively. The area of other area may be much smaller than the area of the assembly area, usually the area of other area may be limited to the installation of a single vertical keel 33;

(2) installing the keel subassembly 30 in the assembly area, and making the edge of the keel subassembly 30 coincide with the mark on the base layer finish surface; wherein the plurality of vertical keels 33 may be connected between the sky keel 31 and the ground keel 32 at intervals, a support seat 10 may be installed in the mounting hole of each vertical keel 33, and the sky keel 31 and the ground keel 32 may be respectively connected to the upper part and the lower part of the wall;

(3) inserting the leveling screw 20 into the first through hole 11 of the support seat 10 and moving along the first through hole 11 until the end surface of the leveling screw 20 located outside the first through hole 11 abuts the wall 40, and the end surface of the leveling screw 20 located in the first through hole 11 can be arranged flush with the leveling prompt portion 13; driving the leveling screw 20 to rotate within a preset range, so that the first thread section 12 is threadedly connected with the second thread section 22;

(4) fixing the leveling screw 20 on the wall 40 with a fixing member;

(5) repeating steps (3) and (4) until the leveling screw 20 is installed in each support seat 10;

(6) installing at least one vertical keel 33 in the other area, installing a support seat 10 in the mounting hole of each vertical keel 33, and connecting both ends of the vertical keel 33 to the wall 40; repeating steps (3) and (4) until the leveling screw 20 is installed in each support seat 10.

According to the installation area of the wall, the wall may be divided into assembly area

and other area. The assembly area may be used to install keel subassemblies. other area may be usually provided near the door or window. Due to the limited installation space, only the vertical keel and leveling subassemblies may be usually installed, thereby ensuring that the assembly area and other area maintain the same support height. Using the above installation method of the wall leveling assembly, the two ends of the vertical keel may be connected to the sky keel and the ground keel respectively, and the sky keel and the ground keel may be connected to the upper part and the lower part of the wall respectively, so that the vertical keel may be arranged opposite to the wall. The support seat may be used in conjunction with the vertical keel, and then the leveling screw may be screwed into the first through hole of the support seat, and the insertion depth of the leveling screw may be adjusted to provide effective support for the vertical keel and maintain the straight extension of the vertical keel, to achieve the leveling of the vertical keel relative to the wall, so as to provide the same support height for the decorative layer installed above the vertical keel. The support seat and the leveling screw may be threaded to improve the leveling accuracy. Moreover, the first thread section and the second thread section adopt a half-thread structure, which can limit the rotation angle to avoid excessive adjustment and ensure the stability of the connection. Further, the support seat can be installed on the vertical keel before leaving the factory, and only the installation and positioning of the leveling screw may be required at the construction site. The installation steps may be simple, the assembly difficulty may be reduced, and the installation efficiency may be increased.

Preferably, the vertical keel 33 may include a first support plate and first side plates extending from opposite sides of the first support plate along the same direction respectively. The two first side plates and the first support plate may be enclosed and formed a first receiving groove for receiving the support seat 10; a plurality of mounting holes may be provided on the first support plate. The opposite side walls of the support seat 10 may be provided with elastic clips 18, and the first side plate may be provided with card slots that are used in conjunction with and corresponding to the elastic clips 18 one-to-one. In step (2), it may also include: installing the support seat 10 in the first receiving groove, and the two elastic clips 18 of the support seat 10 may be snap-fitted the two card slots on the two first side plates. By providing the elastic clips 18 and the card slots to cooperate with each other, the snap-fitted connection between the support

seat 10 and the vertical keel 33 can be realized. Before installation, the support seat 10 and the vertical keel 33 can be installed in advance. When transported to the installation site, only the matched leveling screw 20 needs to be installed, which reduces the transportation difficulty and increases the installation efficiency.

Preferably, a limit baffle 14 may be provided on the same side edge of each first thread section 12, and the limit baffle 14 may extend obliquely upwards toward the first thread section 12, so that the second thread section 22 can rotates within a preset range according to a preset direction on the first thread section 12. Step (3) may also include: blocking the reverse rotation of the leveling screw 20 by each of the limit baffles 14 when the leveling screw 20 is inserted into the first through hole 11; limiting the rotation range of the leveling screw 20 by the plurality of limit baffles 14. By providing the limit baffle 14, it may be restricted that the leveling screw 20 inserted into the first through hole 11 can only rotate in one direction (such as clockwise) and cannot rotate in the reverse direction. The plurality of limit baffles 14 can limit the rotation range of the leveling screw 20 that can be rotated forward or reverse within the rotation range, and the rotation range does not exceed 120°, usually 90°, to avoid the leveling screw 20 from falling out of the first through hole 11, causing connection failure.

Preferably, the sky keel 31 may include a second support plate and second side plates extending from opposite sides of the second support plate along the same direction, respectively. The second support plate may be provided with a plurality of first fixing holes spaced along the length direction. In step (2), it may also include: the top ends of the plurality of vertical keels 33 may be distributed at equal intervals along the extension direction of the second support plate, and each vertical keel 33 may abut the wall 40. The second side plate may extend to the side away from the first receiving groove, the first fixing member may be used to penetrate the first fixing hole and may be fixed to the upper part of the wall. The second support plate may be used to support the vertical keel 33, the second side plate may abut the decorative layer, and the first fixing hole may be used to install a first fixing member (such as a screw 34) so that the vertical keel 33 may be installed and positioned on the wall 40.

Preferably, the ground keel 32 may include a third support plate, and a third side plate and a fourth side plate respectively extending from opposite sides of the third support plate along the

same direction. The length of the third side plate may be greater than the length of the fourth side plate. The third side plate, the fourth side plate, and the third support plate may enclose to form a second receiving groove for receiving the vertical keel 33, and the third side plate may be provided with a plurality of second fixing holes spaced apart along the length; In step (2), it may further include: abutting the third support plate against the ground, abutting the fourth side plate against the lower part of the wall; inserting the bottom ends of the plurality of the vertical keels 33 into the second receiving groove, and distributing at equal intervals along the extension direction of the second receiving groove; using a second fixing member to penetrate the second fixing hole, and fixing with the lower part of the wall. The second receiving groove may be used to install and limit the vertical keel 33, the fourth side plate may abut the wall 40, and the second fixing hole may be used to install a second fixing member (such as a screw 34), such that the vertical keel 33 may be installed and positioned on the wall.

The following may further introduce the installation method of the wall leveling assembly. Two-side wall is taken as an example, where a door frame may be provided on the horizontal wall, which may be referred to as Wall A for short, and the vertical wall may be referred to as Wall B for short.

(1) Since there is a door frame on Wall A, Wall A may be divided into assembly area and other area. A base layer starting position mark (for example, using bullet line marks) of Facade A may be provided on the side of Wall A close to Wall B. A base layer starting position mark (located in other area) may be provided on each of the two sides of the door frame. A base layer finish surface mark of Facade A (located in other area) may be provided on one side of Wall B close to Wall A. A base layer finish surface mark may be provided in front of Wall A. Wall B may be all assembly areas. A base layer starting position mark of Facade B may be provided on the side of the Wall B close to the Wall A. A base layer finish surface mark may be provided on the side of the Wall A close to the Wall B. A base layer finish surface mark may be provided in front of the Wall B;

(2) According to the installation area of the assembly area of Wall A, the keel subassembly of matching size may be installed. The plurality of the support seats 10 may be installed into the first receiving groove of the vertical keel 33, so that the corresponding position of each mounting

hole may be installed with the support seat 10. The sky keel 31 and the ground keel 32 may be arranged oppositely, and the plurality of vertical keels 33 may be sequentially distributed between the sky keel 31 and the ground keel 32 according to a preset distance;

(3) The top end of the vertical keel 33 may be fixed on the second support plate of the sky keel 31 with screws 34, the bottom end of the vertical keel 33 may be inserted into the second receiving groove of the ground keel 32, and fixed on the third side plate of the ground keel 32 with screws 34;

(4) The assembled keel subassembly may be placed opposite to the wall 10, wherein the first side plate of the vertical keel 33 may abut against the wall 40, and the third support plate of the ground keel 32 may abut against the ground. The vertical keel 33 located at both ends may abut on the base layer starting position mark of Facade A of the Wall A. The outer edges of the vertical keel in the thickness direction may be respectively overlapped with the base layer finish surface mark provided at the side of Wall B close to Wall A, and the base layer finish surface mark provided in front of Wall;

(5) Then, the leveling screw 20 may be adopted to level and fix the four corners, and then to level and fix them one by one. The Allen wrench may be inserted into the mount section of the second through hole 21, and the leveling screw 20 may be inserted into the first through hole 11. The second thread section 22 of the leveling screw 20 may be arranged oppositely to the first smooth surface of the first through hole 11, and the first thread section 12 of the first through hole 11 may be arranged oppositely to the second smooth surface of the leveling screw 20. The leveling screw 20 may be pushed to move toward the wall side along the first through hole 11 until it abuts on the wall. At this time, if the leveling prompt portion 13 is not exposed or is not flush with the end surface of the leveling screw 20, the leveling screw 20 can be rotated so that the first thread section 12 and the second thread section 22 are threadedly connected. The limit baffle 14 can restrict the leveling screw 20 inserted into the first through hole 11 to only rotate in one direction (e.g. clockwise). The plurality of the limit baffles 14 can limit the rotation range of the leveling screw 20 (eg 90°), to prevent excessive rotation from falling off the first through hole 11. The self-tapping screws may be adopted to install to the fixing section of the second through hole 21 in order to fix the leveling screw 20 on the wall. if the leveling prompt portion

13 has been exposed, but the leveling screw 20 does still not abut the wall, the leveling screw 20 may be removed from the first through hole 11 and replaced with a longer leveling screw 20 for reinstalling;

(6) Steps (2)~(5) may be repeated to complete the leveling of Wall B;

(7) In other area, a base layer starting position mark of Facade A may be provided at each of two sides of the door frame. The vertical keel 33 may be installed and the plurality of the support seats 10 may be installed into the first receiving groove of the vertical keel 33, such that the support seat 10 may be installed at the corresponding position of each mounting hole. Step (5) may be repeated to complete the leveling and fixing of the vertical keel 33.

It can be seen from the above description and practice that the wall leveling assembly and installation method provided by the present disclosure, compared with the prior art, have the following advantages: the two ends of the vertical keel are connected with the sky keel and the ground keel, and the sky keel and the ground keel is respectively connected with the upper part and the lower part of the wall, so that the vertical keel is arranged opposite to the wall. The decorative layer can be installed on the wall through the vertical keel, which reduces the difficulty of assembly and increases the assembly speed. The support seat is used in conjunction with the vertical keel, then the leveling screw is screwed into the first through hole of the support seat, and the insertion depth of the leveling screw is adjusted to provide effective support for the vertical keel and maintain the straight extension of the vertical keel, such that the leveling of the vertical keel is realized relative to the wall, and the decorative layer installed above the vertical keel is provided with the same support height. The support seat and the leveling screw are threadedly connected to improve the leveling accuracy. Moreover, the first thread section and the second thread section both adopt a semi-thread structure, which can limit the rotate angle, to avoid excessive adjustment and ensure the stability of the connection. Further, the support seat can be installed on the vertical keel before leaving the factory. Only the installation and positioning of the leveling screw need to be completed at the construction site. The installation steps may be simple and the assembly difficulty may be reduced, so as to improve installation speed.

Those of ordinary skill in the art should understand that the above are only specific

embodiments of the present disclosure and are not intended to limit the present disclosure. Any modification, equivalent replacement, improvement, etc. made within the spirit of the present disclosure should be included in the protection scope of the present disclosure.

What is claimed is:

1. A wall leveling assembly, comprising:

a keel subassembly comprising a sky keel, a ground keel, and a plurality of vertical keels connected between the sky keel and the ground keel and distributed in sequence; the sky keel and the ground keel being respectively connected with an upper part and a lower part of a wall; each vertical keel being provided with a plurality of mounting holes spaced apart along a length;

leveling subassemblies, each of the leveling subassemblies being installed at a corresponding position of each mounting hole; the each of leveling subassemblies comprising a support seat and a leveling screw, the support seat being used to detachably connect with the each vertical keel; the support seat being provided with a first through hole penetrating in a thickness direction and being arranged opposite to the mounting hole; an inner wall of the first through hole being provided with a plurality of first thread sections spaced and evenly distributed in a circumferential direction; a leveling prompt portion being provided between two adjacent first thread sections; the leveling screw being provided with a second through hole penetrating in a thickness direction; an outer wall of the leveling screw being provided with a plurality of second thread sections spaced and evenly distributed in a circumferential direction, and used in conjunction with the first thread sections; the leveling screw being able to move along the first through hole, and one end surface of the leveling screw located in the first through hole being flush with the leveling prompt portion.

2. The wall leveling assembly according to claim 1, wherein:

the each vertical keel comprises a first support plate and two first side plates extending from opposite sides of the first support plate along a same direction respectively, the two first side plates and the first support plate are enclosed to form a first receiving groove for receiving the support seat; the plurality of the mounting holes are all provided on the first support plate; elastic clips are provided on opposite side walls of the support seat, the two first side plates are provided with card slots that cooperate with the elastic clips and correspond to each other.

3. The wall leveling assembly according to claim 1 or 2, wherein:

each of the first thread sections is provided with a limit baffle on a same side edge, and the limit baffle extends obliquely upwards toward the each of the first thread sections, so that each second thread section can rotate within a preset range according to a preset direction on the each of the first thread sections.

4. The wall leveling assembly according to claim 1 or 2, wherein:

the sky keel comprises a second support plate and second side plates extending from opposite sides of the second support plate along a same direction respectively, and the second support plate is provided with a plurality of first fixing holes spaced along a length direction.

5. The wall leveling assembly according to claim 1 or 2, wherein:

the ground keel comprises a third support plate and a third side plate and a fourth side plate extending from opposite sides of the third support plate along a same direction, and the third side plate is longer than the fourth side plate; the third side plate, the fourth side plate and the third support plate are enclosed to form a second receiving groove for receiving the each vertical keel, and the third side plate is provided with a plurality of second fixing holes arranged at intervals along a length direction.

6. A method for installing the wall leveling assembly according to claim 1, comprising steps of:

(1) providing a base layer starting position mark and a base layer finish surface mark on the wall and its surroundings of an area to be installed; dividing the wall into an assembly area and/or an other area according to the base layer starting position mark;

(2) installing the keel subassembly in the assembly area, and making an edge of the keel subassembly coincide with the base layer finish surface mark; wherein the plurality of vertical keels are connected between the sky keel and the ground keel at intervals, a support seat is installed in the mounting hole of each vertical keel, and the sky keel and the ground keel are respectively connected to the upper part and the lower part of the wall;

(3) inserting the leveling screw into the first through hole of the support seat and moving

along the first through hole until an end surface of the leveling screw located outside the first through hole abuts the wall, and the end surface of the leveling screw located in the first through hole is arranged flush with the leveling prompt portion; driving the leveling screw to rotate within a preset range, so that the first thread section is threadedly connected with the second thread section;

(4) fixing the leveling screw on the wall with fixing members;

(5) repeating Steps (3) and (4) until the leveling screw is installed in each support seat;

(6) installing at least one vertical keel in the other area, installing the support seat in the mounting hole of each vertical keel, and connecting both ends of the each vertical keel to the wall; repeating Steps (3) and (4) until the leveling screw is installed in each support seat.

7. The method for installing the wall leveling assembly according to claim 6, wherein,

the each vertical keel comprises a first support plate and two first side plates extending from opposite sides of the first support plate along a same direction respectively; the two first side plates and the first support plate are enclosed to form a first receiving groove for receiving the support seat; the plurality of the mounting holes are all provided on the first support plate; elastic clips are provided on opposite side walls of the support seat, the two first side plates are provided with card slots that cooperate with the elastic clips and correspond to each other; Step (2) further comprises: installing the support seat in the first receiving groove, two elastic clips of the support seat are respectively engaged with the card slots on the two first side plates.

8. The method for installing the wall leveling assembly according to claim 7, wherein:

each of the first thread sections is provided with a limit baffle on a same side edge, and the limit baffle extends obliquely upwards toward the each of the first thread sections, so that each second thread section can rotate within a preset range according to a preset direction on the each of the first thread sections; Step (3) further comprises: blocking a reverse rotation of the leveling screw by each limit baffle when the leveling screw is inserted into the first through hole; limiting the rotation range of the leveling screw by the each limit baffle.

9. The method for installing the wall leveling assembly according to claim 8, wherein:

the sky keel comprises a second support plate and second side plates extending from opposite sides of the second support plate along a same direction respectively, and the second support plate is provided with a plurality of first fixing holes spaced along a length direction; Step (2) further comprises: setting top ends of the plurality of the vertical keels distributed at equal intervals in sequence along an extension direction of the second support plate, and abutting the each vertical keel against the wall; extending the second side plate to a side away from the first receiving groove, and using a first fixing member to penetrate the first fixing hole and being fixed to the upper part of the wall.

10. The method for installing the wall leveling assembly according to claim 9, wherein:

the ground keel comprises a third support plate and a third side plate and a fourth side plate extending from opposite sides of the third support plate along a same direction, and the third side plate is longer than the length of the fourth side plate, the third side plate, the fourth side plate and the third support plate are enclosed to form a second receiving groove for receiving the vertical keel, and the third side plate is provided with a plurality of second fixing holes arranged at intervals along a length direction; Step (2) further comprises: abutting the third support plate against the ground, abutting the fourth side plate against the lower part of the wall; inserting the bottom ends of the plurality of vertical keels into the second receiving groove, and distributing the plurality of vertical keels at equal intervals along an extension direction of the second receiving groove; using a second fixing member to penetrate the second fixing hole, and fixing with the lower part of the wall.