

positioning manner, such as a clamp, etc., may also be adopted as required.

[0051] In some embodiments, as shown in FIG. 2 and FIG. 4, a first hole 127 is provided on the lower plate 120, and the first hole 127 penetrates the lower plate 120 in a thickness direction (e.g., a vertical direction) of the lower plate. The first hole 127 is, for example, an elongated hole extending substantially along the translation direction. In order to position the lower plate 120 relative to the apparatus frame, the adjusting and positioning device further includes a first fastener 107, and the first fastener is inserted into the first hole 121 and screwed to the apparatus frame, so as to mount the lower plate 120 to the apparatus frame. For example, the lower plate is detachably fixed to the apparatus frame. The first fastener 107, for example, in a form of a bolt (e.g., a single-ended bolt or a combination of a bolt and a nut), may be tightened to press the lower plate against the apparatus frame. The first fastener 107 may be released during the translational movement described above, but is still fixed to the apparatus frame and inserted into the first hole 127, so as to allow the lower plate 120 to translate relative to the apparatus frame with an inner wall of the first hole 127 abutting the first fastener 107. Thus, during such translational movement, the first fastener ~~translates relative to the apparatus frame and~~ remains fixed relative to the apparatus frame, and a cooperation of the first fastener with the elongated first hole may guide the lower plate to translate relative to the apparatus frame. After the base and the ray source assembly supported thereon are translated to a suitable position, the first fastener is tightened again, so as to fixedly press the lower plate against the apparatus frame or fixedly position the lower plate relative to the apparatus frame, thereby avoiding a necessary movement of the ray source assembly during operation.

[0052] In addition that the cooperation of the first fastener with the elongated first hole may guide the translation of the lower plate relative to the apparatus frame, in some embodiments, as shown in FIG. 2 and FIG. 4, an additional elongated hole 128 may also be provided on the lower plate 120, the additional elongated hole 128 extends along the above translation direction, and a positioning member 129 partially positioned in the elongated hole 128 is fixed to the apparatus frame, such that a

cooperation of the elongated hole 128 with the positioning member 129 may also guide such a translation movement, and it may also ensure a correct positioning or mounting of the lower plate.

[0053] As shown in FIG. 1 and FIG. 2, the upper plate 110 and the lower plate 120 are configured or arranged such that the first fastener 107 is exposed, so as to facilitate mounting and detaching, while facilitating adjustment during the translation. For example, some of the first fasteners 107 and the first holes ~~107~~127 are arranged at exposed corners of the lower plate 110, and some other fasteners 107 are exposed through notches 117 in the upper plate 110.

[0054] As shown in FIG. 1 and FIG. 2, the adjusting and positioning device may further include a translation guide member 500, which may be fixed to the apparatus frame for guiding the translation movement of the base. For example, the translation guide member 500 may be in a form of a wedge-shaped holder or plate, one side of which, for example, abuts against a side face of the lower plate 120 extending parallel to the translation direction, thereby avoiding wobbling or deflection of the lower plate and the base during the translation. Exemplarily, translation guide members may be respectively provided on two opposite sides of the lower plate, so as to guide such translation movement more stably.

[0055] In some embodiments, the above connection of the upper plate and the lower plate may be realized in a following manner. As shown in FIG. 2-FIG. 4, a second hole 123 is provided on the lower plate 120, a third hole 113 is provided at a position of the upper plate 110 corresponding to the second hole 123, and the third hole 113 penetrates the upper plate 110 in the thickness direction (or the vertical direction). Exemplarily, the third hole 113 is elongated, and is angled or inclined relative to the translation direction. The adjusting and positioning device further includes a second fastener 103 inserted into and passing through the third hole 113 to be engaged with the second hole 123, so as to fasten the upper plate 110 to the lower plate 120, such that the lower plate 120 may drive the upper plate 110 to translate together during the translational movement.

[0056] The second fastener 103 includes, for example, a bolt (such as a

What is claimed is:

1. A device for adjusting and positioning, configured to adjust an orientation of a ray source assembly of a radiation scan imaging apparatus, wherein the radiation scan imaging apparatus has an apparatus frame, and the device for adjusting and positioning comprises:

a base (100) comprising a first component and a second component configured to be connected to each other, and is configured to support the ray source assembly (10), such that the ray source assembly is vertically positioned on the second component;

a first adjustment mechanism (200) configured to be mounted to the first component of the base and the apparatus frame, and is configured to drive the ray source assembly to translate in a first direction by driving an entire base to move relative to the apparatus frame, so as to adjust a position of the ray source assembly; and

a second adjustment mechanism (300) configured to be mounted to the second component of the base and the apparatus frame, and is configured to drive the ray source assembly to rotate within an angle range by driving the second component to move relative to the first component, so as to adjust a beam emitting direction of the ray source assembly.

2. The device for adjusting and positioning according to claim 1, wherein the base comprises an upper plate (110) as the second component and a lower plate (120) as the first component, the upper plate and the lower plate are configured to be stacked on each other in a vertical direction, such that the ray source assembly is positioned on an upper surface of the upper plate, and the upper plate and the lower plate are configured to be connected together in a manner that they are movable relative to each other.

3. The device for adjusting and positioning according to claim 2, ~~wherein~~

configured for an upright shaft (121) ~~is to be~~ provided on an upper surface of the lower plate facing the upper plate, for a through hole (111) ~~is to be~~ provided at a position of the upper plate corresponding to the shaft, the shaft being configured to pass~~es~~ through the through hole and to extend~~s~~ upwardly so as to engage with a corresponding shaft hole of the ray source assembly, such that the ray source assembly and the upper plate are capable of rotating around the shaft under a driving of the second adjustment mechanism.

4. The device for adjusting and positioning according to claim 3, ~~wherein~~ configured for the shaft ~~is to be~~ positioned such that an axis of the shaft substantially coincides with a vertical axis of the ray source assembly.

5. The device for adjusting and positioning according to claim 2, ~~wherein~~ configured for a positioning pin (112) ~~is to be~~ provided on an upper surface of the upper plate facing away from the lower plate, for the positioning pin ~~is being to be~~ engaged with a corresponding pin hole of the ray source assembly, so as to position the ray source assembly by preventing the ray source assembly from moving relative to the upper plate in a plane perpendicular to the vertical direction.

6. The device for adjusting and positioning according to any one of claims 1-5, wherein the first adjustment mechanism comprises:

a first holder (210) configured to be fixed to the apparatus frame; and

a first adjustment bolt (230) configured to be threadedly engaged with the first holder and to be connected to the first component, such that a rotation of the first adjustment bolt relative to the first holder drives the first component to translate, so as to drive the second component connected with the first component and the ray source assembly positioned on the second component to translate relative to the apparatus frame along the first direction.

7. The device for adjusting and positioning according to any one of claims

1-5, wherein

an elongated first hole (127) is provided on the first component, the elongated first hole penetrates the first component and extends in the first direction; and

the device for adjusting and positioning further comprises a first fastener (107) configured to be inserted into the first hole and tightened so as to mount the first component to the apparatus frame, and the first fastener is configured to be releasable during a translation movement so as to allow the first component to translate relative to the apparatus frame in a manner that an inner wall of the first hole abuts against the first fastener.

8. The device for adjusting and positioning according to any one of claims 1-5, wherein the device for adjusting and positioning further comprises a translation guide member (500) configured to be fixed to the apparatus frame and configured to guide the base to translate.

9. The device for adjusting and positioning according to any one of claims 1-5, wherein the second adjustment mechanism comprises:

a second holder (310) configured to be fixed to the apparatus frame; and

a second adjustment bolt (320) configured to be threadedly engaged with the second holder and to be connected to the second component, such that a rotation of the second adjustment bolt relative to the second holder drives the second component to rotate, so as to drive the ray source assembly positioned on the second component to rotate.

10. The device for adjusting and positioning according to claim 9, wherein the second adjustment bolt is arranged such that a rotation of the second adjustment bolt relative to the second seat applies to the second component a force tangent to a circumferential direction of the rotation of the second component.

11. The device for adjusting and positioning according to any one of claims 1-5, wherein

a second hole (123) is provided on the first component;

an elongated third hole (113) is provided on the second component, the elongated third hole penetrates the second component and extends in a direction at an angle to the first direction;

the device for adjusting and positioning further comprises a second fastener (103) configured to be inserted into and passing through the third hole and to be engaged with the second hole so as to fasten the second component to the first component, and configured to be releasable during the rotation so as to allow the second component to rotate in a manner that an inner wall of the third hole abuts against the second fastener.

12. The device for adjusting and positioning according to claim 11, wherein the elongated third hole extends in a direction tangent to as circumferential direction of the rotation of the second component.

13. The device for adjusting and positioning according to claim 6, wherein the first adjustment mechanism further comprises:

A third holder (220) configured to be fixed to the first component and to be connected with the first adjustment bolt.

14. The device for adjusting and positioning according to claim 9, wherein the second adjustment mechanism further comprises:

A fourth holder (330) configured to be fixed to the second component and to be connected with the second adjustment bolt.

15. A radiation scan imaging apparatus, comprising a ray source assembly and the device for adjusting and positioning according to any one of claims 1-14, wherein the ray source assembly is configured to be supported on the device for

adjusting and positioning, such that an orientation of the ray source assembly is adjusted by the device for adjusting and positioning.

16. A method for adjusting an orientation of a ray source assembly of a radiation scan imaging apparatus by using the device for adjusting and positioning according to claim 1, comprising at least one of the following steps:

a translation adjustment step, comprising: driving an entire base to move relative to the apparatus frame through the first adjustment mechanism, thereby driving the ray source assembly to translate in the first direction, so as to adjust a position of the ray source assembly; and

a rotation adjustment step, comprising: driving the second component to move relative to the first component through the second adjustment mechanism, thereby driving the ray source assembly to rotate within an angle range, so as to adjust a beam emitting direction of the ray source assembly.

17. The method according to claim 16, wherein

the base comprises an upper plate as the second component and a lower plate as the first component, the upper plate and the lower plate are stacked on each other in a vertical direction, such that the ray source assembly is positioned on an upper surface of the upper plate, and the upper plate and the lower plate are connected together in a manner that they are movable relative to each other;

the translation adjustment step comprises: driving the upper plate and the lower plate to move together relative to the apparatus frame through the first adjustment mechanism, so as to drive the ray source assembly to translate in the first direction; and

the rotation adjustment step comprises: driving the upper plate to rotate relative to the lower plate through the second adjustment mechanism, so as to drive the ray source assembly to rotate.

18. The method according to claim 17, wherein

an upright shaft is provided on an upper surface of the lower plate facing the upper plate, a through hole is provided at a position of the upper plate corresponding to the shaft, the shaft passes through the through hole and extends upwardly so as to engage with a corresponding shaft hole of the ray source assembly; and

the rotation adjustment step further comprises: driving the upper plate and the ray source assembly to rotate about the shaft through the second adjustment mechanism.

19. The method according to claim 16, wherein

the first adjustment mechanism comprises: a first holder configured to be fixed to the apparatus frame; and a first adjustment bolt threadedly engaged with the first holder and connected to the first component; and

the translation adjustment step comprises: rotating the first adjustment bolt relative to the first holder to drive the first component to translate, so as to drive the second component connected with the first component and the ray source assembly positioned on the second component to translate relative to the apparatus frame along the first direction.

20. The method according to claim 16, wherein

an elongated first hole is provided on the first component, the first hole in an elongated shape penetrating the first component and extending in the first direction;

the device for adjusting and positioning further comprises a first fastener inserted into the first hole and tightened so as to mount the first component to the apparatus frame; and

the translation adjustment step further comprises: releasing the first fastener and driving the first component to translate relative to the apparatus frame through the first adjustment mechanism in a manner that an inner wall of the first hole abuts against the first fastener.

21. The method according to claim 16, wherein
the second adjustment mechanism comprises a second holder configured to be fixed to the apparatus frame; and a second adjustment bolt threadedly engaged with the second holder and connected to the second component; and
the rotation adjustment step comprises: rotating the second adjustment bolt relative to the second holder to drive the second component to rotate, so as to drive the ray source assembly positioned on the second component to rotate.
22. The method according to claim 16, wherein the rotation adjustment step comprises: applying a force to the second component in a direction tangent to a circumferential direction of a rotation of the second component through a rotation of the second adjustment bolt relative to the second holder.
23. The method according to claim 16, wherein
a second hole is provided on the first component;
an elongated third hole is provided on the second component, the third hole penetrates the second component and extends in a direction at an angle to the first direction;
the device for adjusting and positioning further comprises a second fastener inserted into and passing through the third hole and engaged with the second hole so as to fasten the second component to the first component; and
the rotation adjustment step comprises: releasing the second fastener to allow the second component to rotate under a driving of the second adjustment mechanism in a manner that an inner wall of the third hole abuts against the second fastener.