CLAIMS:

1. An inspection system, comprising:

at least one ray source configured to emit X-rays, wherein the at least one ray source is rotatable between at least two scanning positions around a rotation axis, each ray source comprises a separate housing to define a vacuum space and comprises a plurality of target spots enclosed within the housing, a rotation angle of the at least one ray source between two adjacent scanning positions is greater than an angle of adjacent target spots of each ray source relative to the rotation axis;

a detector assembly configured to receive X-rays emitted from the at least one ray source and passing through an inspection region of the inspection system; and

a conveying device configured to carry an object to be inspected,

wherein the at least one ray source and the detector assembly are movable in a traveling direction relative to the conveying device, so that the object to be inspected enters the inspection region, and the traveling direction is parallel to the rotation axis;

wherein the inspection system is configured such that: the at least one ray source and the detector assembly move in the traveling direction relative to the conveying device and the at least one ray source emits X-rays, when the at least one ray source is located at one of the plurality of scanning positions; and the at least one ray source rotates around the rotation axis to another one of the plurality of scanning positions, after the at least one ray source and the detector assembly move a predetermined distance in the traveling direction relative to the conveying device,

characterized in that,

when the at least one ray source rotates between different scanning positions, the at least one ray source does not emit X-rays, and the at least one ray source and the detector assembly do not move in the traveling direction relative to the conveying device.

2. The inspection system of claim 1, wherein the at least one ray source rotates between different scanning positions, so that a combined scanning angle of the at least one ray source is greater than 180 degrees.

3. The inspection system of claim 1, wherein the rotation angle of each ray source between two adjacent scanning positions is less than a scanning angle of the ray source relative to the rotation axis.

4. The inspection system of claim 1, wherein the detector assembly is arranged radially closer to the rotation axis than the at least one ray source.

5. The inspection system of claim 4, wherein target spots of the at least one ray source are located in a first plane;

wherein detector crystals of the detector assembly are located in a second plane; and

wherein the first plane is parallel to the second plane, and a target spot of each ray source is configured to deflect a predetermined tilt angle toward the detector assembly along the rotation axis, so that the X-rays emitted by each ray source are not blocked by the detector assembly before passing through the inspection region.

6. The inspection system of claim 5, wherein the detector assembly comprises a plurality of detector arms, each detector arm is provided with a plurality of detector units, and each detector arm is configured to receive X-rays emitted by at least two of the ray sources;

wherein each detector unit comprises a detector crystal, and each detector crystal is arranged at an end of a corresponding detector unit close to the at least one ray source along the rotation axis;

wherein the plurality of detector arms are configured to extend completely around the rotation axis to form a detector ring;

wherein the inspection system further comprises a rotary bracket rotatable around the rotation axis, and the at least one ray source and the detector assembly are installed on the rotary bracket; and

wherein the detector assembly further comprises a detector turntable, the plurality of detector arms are fixed to the detector turntable, and the detector turntable is detachably fixed to the rotary bracket.

7. The inspection system of claim 1, wherein the at least one ray source comprises a plurality of ray sources, and the plurality of ray sources are configured to

rotate between different scanning positions synchronously; and

wherein the plurality of ray sources are spaced around the inspection region.

8. The inspection system of claim 1, wherein the detector assembly is rotatable around the rotation axis; and

wherein the at least one ray source and the detector assembly are rotatable around the rotation axis synchronously.

9. The inspection system of claim 1, wherein each ray source is further configured to be movable between at least two target spot positions, and a rotation angle of each ray source between two adjacent target spot positions is less than an angle of two adjacent target spots of the ray source relative to the rotation axis, or a movement distance of each ray source between two adjacent target spot positions is less than a spacing between two adjacent target spots of the ray source; and

wherein a rotation angle of each ray source between two farthest target spot positions is less than the angle of two adjacent target spots of the ray source relative to the rotation axis, or a movement distance of each ray source between two farthest target spot positions is less than the spacing between two adjacent target spots of the ray source.

10. The inspection system of claim 1, wherein the at least one ray source is always located above the conveying device during a rotation process;

wherein the rotation axis is parallel to a horizontal direction;

wherein a ray emission direction of the at least one ray source is not perpendicular to the rotation axis;

wherein the at least one ray source and the detector assembly move a predetermined distance in the traveling direction relative to the conveying device, so that the object to be inspected completely passes through the inspection region or the object to be inspected does not completely pass through the inspection region; and

wherein the rotation angle of the at least one ray source between two adjacent scanning positions is greater than an angle of any two target spots of each ray source relative to the rotation axis.

11. An inspection method, comprising:

(a) carrying an object to be inspected on a conveying device;

(b) positioning at least one ray source at one of a plurality of scanning positions surrounding an inspection region, wherein each ray source comprises a separate housing to define a vacuum space and comprises a plurality of target spots enclosed within the housing;

(c) moving the at least one ray source and a detector assembly in a traveling direction relative to the conveying device, so that the object to be inspected enters the inspection region, while the at least one ray source emits X-rays, the X-rays pass through the object to be inspected located in the inspection region and are received by the detector assembly, and a scanning process is completed until the at least one ray source and the detector assembly move a predetermined distance in the traveling direction relative to the conveying device; and

(d) rotating the at least one ray source around a rotation axis to another one of the plurality of scanning positions, and repeating step (c) to complete the scanning process at each of the plurality of scanning positions, wherein a rotation angle of the at least one ray source between two adjacent scanning positions is greater than an angle of adjacent target spots of each ray source relative to the rotation axis, and the traveling direction is parallel to the rotation axis,

characterized in that,

when the at least one ray source rotates between different scanning positions, the at least one ray source does not emit X-rays, and the at least one ray source and the detector assembly do not move in the traveling direction relative to the conveying device.

12. The inspection method of claim 11, wherein steps (c) and (d) are repeated, so that a combined scanning angle of the at least one ray source is greater than 180 degrees.

13. The inspection method of claim 11, wherein the at least one ray source and the detector assembly stop moving relative to the conveying device after each time the object to be inspected completely passes through the inspection region, and in two adjacent repetitions of step (c), the ray source and the detector assembly move in opposite directions relative to the conveying device, and the rotation angle of each ray

source between two adjacent scanning positions is less than a scanning angle of the ray source relative to the rotation axis;

wherein the method further comprises: after completing a scanning process at a scanning position in step (c), moving the at least one ray source to one of a plurality of target spot positions and repeating step (c), wherein the plurality of target spot positions comprise a current scanning position, wherein a rotation angle of each ray source between two adjacent target spot positions is less than an angle of two adjacent target spots of the ray source relative to the rotation axis, or a movement distance of each ray source between two adjacent target spot positions is less than a spacing between two adjacent target spots of the ray source; and

wherein a rotation angle of each ray source between two farthest target spot positions is less than the angle of two adjacent target spots of the ray source relative to the rotation axis, or a movement distance of each ray source between two farthest target spot positions is less than the spacing between two adjacent target spots of the ray source.

14. The inspection method of claim 11, wherein the at least one ray source is always located above the conveying device during a rotation process of the at least one ray source;

wherein the rotation axis is parallel to a horizontal direction;

wherein a ray emission direction of the at least one ray source is not perpendicular to the rotation axis;

wherein the at least one ray source and the detector assembly move a predetermined distance in the traveling direction relative to the conveying device, so that the object to be inspected completely passes through the inspection region or the object to be inspected does not completely pass through the inspection region; and

wherein the rotation angle of the at least one ray source between two adjacent scanning positions is greater than an angle of any two target spots of each ray source relative to the rotation axis.