DETECTION CHANNEL, CHANNEL ASSEMBLY AND CT DETECTION DEVICE

TECHNICAL FIELD

[1] The present disclosure relates to a field of radiation detection, and in particular to a detection channel, a channel assembly including the detection channel, and a CT detection device including the detection channel.

BACKGROUND

[2] Generally, when a CT detection device is in operation, an object to be detected enters the detection device from one end of the detection device, and leaves the detection device from the other end of the detection device. In this detection process, the space where the object to be detected moves is a channel of the CT detection device. A strength, a stiffness, a wear resistance, an assembly difficulty, etc. of the channel are all crucial to the CT detection device.

SUMMARY

[3] The embodiments of the present disclosure provide an improved detection channel, a channel assembly including the detection channel and a CT detection device including the detection channel. They achieve the greater strength, stiffness, and wear resistance with less weight, and are easy for assembly and maintenance.

[3a] Aspects of the invention are defined in the independent claims. Some optional features of the invention are defined in the dependent claims.

[4] According to an exemplary arrangement, a detection channel for a CT detection device is provided, including: a base having two open ends, wherein the base is configured to allow an object to be detected to pass through the detection channel, wherein the overall detection channel is integrally made of a carbon fiber composite material.

[5] According to an exemplary embodiment of the present disclosure, the carbon fiber

composite material includes a carbon fiber layer, an aramid honeycomb paper layer and an aramid layer stacked in sequence.

[6] According to an exemplary embodiment of the present disclosure, a thickness of the carbon fiber layer is 0.1-0.5mm, a thickness of the aramid honeycomb paper layer is 1-10mm, and a thickness of the aramid layer is 0.1-0.5mm.

[7] According to an exemplary embodiment of the present disclosure, the carbon fiber layer is located on an inner side of the detection channel.

[8] According to an exemplary embodiment of the present disclosure, a connecting surface is provided on at least one of two ends of the base, and the connecting surface is configured to be connected to a transmission channel so as to form a through channel assembly.

[9] According to an exemplary embodiment of the present disclosure, an outer side of the base is sleeved with at least one annular member for mounting a lead plate.

[10] According to an exemplary embodiment of the present disclosure, the outer side of the base includes a region where the lead plate is not installed so as to allow an incidence of a detection radiation from the region.

[11] According to an exemplary embodiment of the present disclosure, a thickness of an aramid honeycomb paper layer in the carbon fiber composite material forming a channel bottom plate of the base is larger than a thickness of an aramid honeycomb paper layer in the carbon fiber composite material forming other portions of the base.

[12] According to another exemplary arrangement, a channel assembly for a CT detection device is provided, including: the detection channel according to any one of the above-mentioned embodiments; and at least one transmission channel in connection and communication with at least one of two ends of the base of the detection channel.

[13] According to an exemplary embodiment of the present disclosure, the channel assembly further includes a transmission belt channel located at bottoms of the detection channel and the transmission channel and configured for a transmission belt to pass through.

[14] According to yet another exemplary arrangement, a CT detection device is provided, including: the detection channel according to any one of the above-mentioned embodiments.

[15] According to an exemplary embodiment of the present disclosure, the CT detection device further includes: a rotating frame provided with a radiation source and a detector; a slip ring bearing, and a support stand, including: a main body portion including a bearing mounting hole, wherein the slip ring bearing is arranged in the bearing mounting hole, and the rotating frame is rotatably disposed on the slip ring bearing; a pedestal located at a bottom portion of the main body portion and configured to support the main body portion; and a connecting portion, wherein a width of a lower portion of a cross section of the connecting portion is greater than a width of an upper portion of the cross section of the connecting portion, an upper portion of the connecting portion is connected to the main body portion, and a lower portion of the connecting portion is connected to the pedestal, wherein the detection channel is arranged in a mounting space of the rotating frame.

[16] Other objectives and advantages of the present disclosure will become apparent from the following descriptions of the present disclosure with reference to the accompanying drawings, which is beneficial to a comprehensive understanding of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[17] FIG. 1 shows a perspective view of a CT detection device according to the embodiments of the present disclosure.

[18] FIG. 2 shows a side view of the CT detection device shown in FIG. 1.

[19] FIG. 3 shows a front view of the CT detection device shown in FIG. 1.

[20] FIG. 4 shows a bottom view of the CT detection device shown in FIG. 1.

[21] FIG. 5 shows a perspective view of a support stand according to the embodiments of the present disclosure.

[22] FIG. 6 shows a front view of the support stand shown in FIG 5.

[23] FIG. 7 shows a bottom view of the support stand shown in FIG. 5.

[24] FIG. 8 shows a cross-sectional view of a support stand according to a first embodiment of the present disclosure taken along direction AA in FIG. 6.

[25] FIG. 9 shows a cross-sectional view of a support stand according to a second