made of concrete or progress work after making and installing a thick shielding device made of lead.

In case of relative small-diameter pipes of less than 2 inches (1.5”, 1.0”, 0.5”, and so on), in order to clearly represent an image of a welded part on a film, a source-to-film distance (SFD) must be secured.

In case of RT work of small-diameter pipes of less than 2 inches, because photographing must be made while a fixed distance between the collimator and the pipe is kept, an amount of radiation exposed to the air is increased. Furthermore, it is urgent to develop a shielding device for RT work of small-diameter pipes of less than 2 inches because there are no shielding structure and method which can shield a certain distance away.

【Disclosure】

【Technical Problem】

Accordingly, embodiments of the present invention seek to solve the above-mentioned problems occurring in the prior arts, and to provide a radiation shielding tube, wherein a guide tube is made of tungsten or the like, which is excellent in shielding performance, and is configured to be movable depending on various positions where a collimator is installed, so that the guide tube can effectively shield radiation exposed during movement of a radiation source or RT work in the tube.

Embodiments of the present invention also seek to provide a shielding device and a shielding method of a pipe, which can easily shield by properly changing a position depending on a source-to-film distance (SFD) requiring a relatively small-diameter pipe of less than 2 inches, and effectively

shield according to various field conditions while rotating at various angles.

【Technical Solution】

There is disclosed a radiation shielding tube including a guide tube connecting a radiation source container and a collimator with each other, wherein the guide tube is formed in an articular form to be bendable.

In an aspect of the present invention, there is provided a shielding device of a pipe including: a radiation shield configured to surround at least a part of a collimator or at least a part of a space between the collimator and the pipe to shield radiation investigated from the collimator; and a jig part which fixes the collimator and supports the radiation shield, wherein the jig part is arranged at a rear end of the pipe in an irradiation direction of radiation so that a distance between the collimator and the pipe is controlled,

wherein the jig part comprises a supporter part which fixes the collimator and articulated arms having one side combined to the pipe and the other side combined to the supporter part, and at least one joints,

wherein the jig part further comprises a shielding block which a film is arranged on a face opposed to the pipe, and

wherein the supporter part comprises:

auxiliary shield supporters which are combined to the shielding block, are formed at both sides of a pipe welding part, and extend toward the collimator;

a side shield supporter which connects a pair of the auxiliary shield supporters with each other and are formed side by side with the pipe;

a collimator holder which is combined to the side shield supporter and fixes the collimator; and

a central shield supporter which combines the articulated arms, is combined to the collimator holder, and is formed side by side with the side shield supporter.

There is also provided a shielding method of a pipe including the steps of: mounting the shielding block and the film on the welding part of the pipe to be inspected; mounting the auxiliary shield supporter on the shielding block after adjusting the SFD according to the size of the pipe; mounting the central shield supporter and the collimator; mounting the articulated arms between the pipe and the central shield supporter; mounting the guide tube on the collimator; hanging the central shield on the central shield supporter; mounting side shields to surround the auxiliary shield supporter; and connecting the radiation source to the guide tube.

【Advantageous Effects】

CLAIMS:

【Claim 1】

A shielding device of a pipe comprising:

a radiation shield configured to surround at least a part of a collimator or at least a part of a space between the collimator and the pipe to shield radiation investigated from the collimator; and

a jig part which fixes the collimator and supports the radiation shield,

wherein the jig part is arranged at a rear end of the pipe in an irradiation direction of radiation so that a distance between the collimator and the pipe is controlled,

wherein the jig part comprises a supporter part which fixes the collimator and articulated arms having one side combined to the pipe and the other side combined to the supporter part, and at least one joints,

wherein the jig part further comprises a shielding block which a film is arranged on a face opposed to the pipe, and

wherein the supporter part comprises:

auxiliary shield supporters which are combined to the shielding block, are formed at both sides of a pipe welding part, and extend toward the collimator;

a side shield supporter which connects a pair of the auxiliary shield supporters with each other and are formed side by side with the pipe;

a collimator holder which is combined to the side shield supporter and fixes the collimator; and

a central shield supporter which combines the articulated arms, is combined to the collimator holder, and is formed side by side with the side shield supporter.

【Claim 2】

The shielding device according to claim 1, wherein the auxiliary shield supporter comprises:

a first auxiliary supporter which is combined to the shielding block and has first assembly holes; and

a second auxiliary supporter for combining the side shield supporter, the second auxiliary supporter which extends from the first auxiliary supporter toward the collimator, is connected to be slidable relative to the first auxiliary supporter, and has a plurality of second assembly holes formed at the corresponding position of the first assembly holes in a sliding direction.

【Claim 3】

The shielding device according to claim 1, wherein the articulated arm has a pipe clamp disposed at one side to be combined while surrounding the outer circumferential surface of the pipe, and the pipe is formed to be rotatable at 360 degrees on a shaft center relative to the pipe clamp.

【Claim 4】

The shielding device according to claim 1, wherein the shielding block comprises: a pipe fixing rope for fixing the shielding block to the pipe by surrounding the outer

circumferential surface of the pipe; and an auxiliary shield supporter holder socket for combining the supporter part.

【Claim 5】

The shielding device according to claim 4, wherein the shielding block comprises: a rope fixing base for fixing one side of the pipe fixing rope; a rope holder for fixing the other side of the pipe fixing rope so that the pipe is bound between the pipe fixing rope and the shielding block; a pipe fixing holder formed at the central portion of the pipe fixing rope to tightly bind the pipe; and pipe protective pads interposed between the shielding block and the pipe and between the pipe fixing holder and the pipe.

【Claim 6】

The shielding device according to claim 5, wherein the rope holder is configured to be able to fix and release the pipe fixing rope so that the pipe is rotatable at 360 degrees on the shaft center when the rope holder releases the pipe fixing rope.

【Claim 7】

The shielding device according to claim 1, further comprising:

a radiation source; and

a guide tube which connects the radiation source and the collimator with each other.

【Claim 8】

The shielding device according to claim 7, wherein joints of the guide tube comprises a spherical ball formed at an end portion, a ball recess formed at the other end portion to rotatably receive the ball of a neighboring joint, a bolt disposed to restrict the ball of the neighboring joint, and a driving groove formed on the outer circumferential surface of the joint to be dented inwardly in

a stepwise form so as to prevent interference when the joints are rotated.

【Claim 9】

The shielding device according to claim 1, wherein the radiation shield comprises:

a central shield which is mounted to hang on the central shield supporter and vertically extends to the shielding block and has a plurality of space parts partitioned vertically, which is filled with a plurality of lead beads in a horizontal direction; and

side shields which are respectively mounted to surround the side shield supporter and the auxiliary shield supporter, and have a plurality of space parts which are filled with a plurality of lead beads in a vertical direction.

【Claim 10】

The shielding device according to claim 1, wherein a radiation shielding tube comprises a guide tube connecting a radiation source container and a collimator with each other, wherein the guide tube is formed in an articular form to be bendable.

【Claim 11】

The shielding device according to claim 10, wherein the guide tube has unit joints which are connected with one another to be overlapped with one another.

【Claim 12】

The shielding device according to claim 11, wherein the guide tube comprises:

a first unit joint connected to the collimator;

a second unit joint connected to the radiation source container; and

one or more third unit joints connecting the first unit joint and the second unit joint with each other.

【Claim 13】

The shielding device according to claim 11, wherein the guide tube is configured such that inner diameters of each of the unit joints have uniform thickness at all parts.

【Claim 14】

The shielding device according to claim 11, wherein the unit joints of the guide tube comprises: an overlap zone which is formed at one end portion such that an end portion of a neighboring unit joint is inserted into the end portion of the former unit joint to be overlapped; a driving part margin zone a extending from the overlap zone to secure an available space when the unit joints rotate mutually; and an overlap margin zone formed at the other end portion to be inserted into the overlap zone of another neighboring unit joint.

【Claim 15】

The shielding device according to claim 14, wherein the overlap margin zone is inserted and connected into the overlap zone of the neighboring unit joint to be overlapped, and a space is formed in a radial direction between the overlap zone and the overlap margin zone, and

wherein the thicknesses of the overlap zone and the overlap margin zone are smaller than or equal to the thickness of the driving part margin zone.

【Claim 16】

The shielding device according to claim 11, wherein the unit joints of the guide tube comprises: a first tube part, which is formed at an end portion and has a uniform inner

diameter such that an end portion of a neighboring unit joint is inserted into the first tube part to be overlapped; a second tube part, which has an inner circumferential surface inclined so that the inner diameter gets gradually smaller inside the first tube part; a third tube part, which has a uniform inner diameter extending from the second tube part; and a fourth tube part, which has a uniform inner diameter extending from the third tube part and is inserted into the first tube part of a neighboring unit joint to be overlapped.