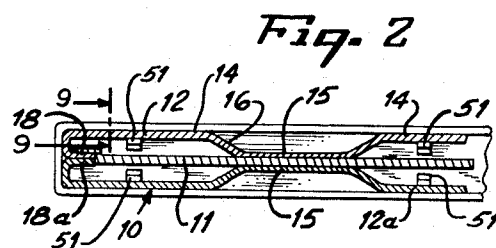
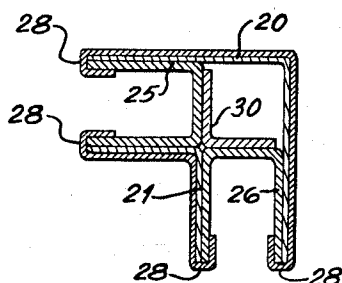
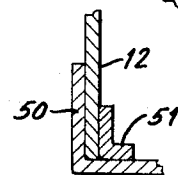
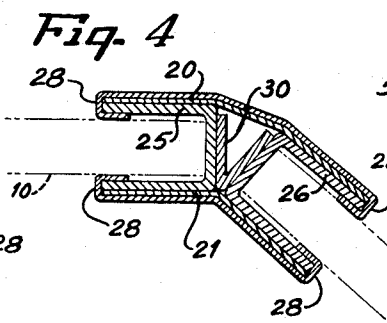
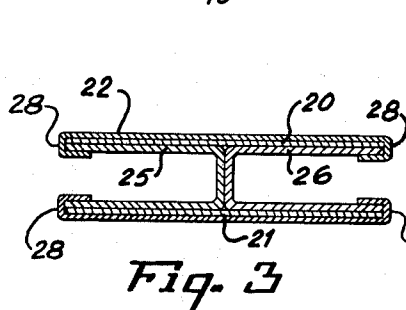
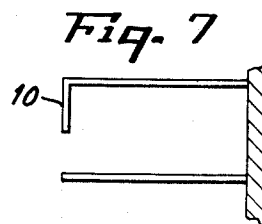
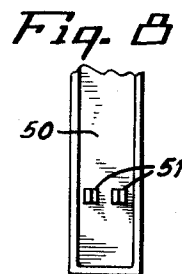
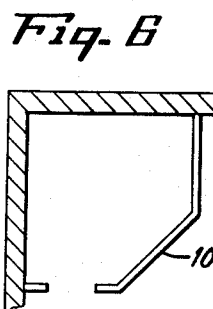
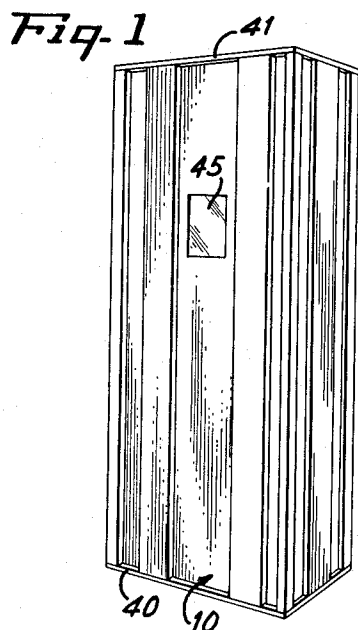


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RADIATION PROTECTIVE PANELS

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RADIATION PROTECTIVE PANELS
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The invention here presented is broadly in the radiation shield art and more particularly presents a protective wall panel to be utilized in the presence of X-ray equipment.

It is commonly necessary to erect shields or walls between X-ray equipment and their operators, to decrease the hazards the equipment presents. It is well known that continuous exposure to X-ray (gamma) radiation can seriously injure the human body.

To effectively block the gamma rays, the shield must be constructed of a relatively dense material such as lead or the like. Since the walls must be of room height, generally seven feet or more, a shield constructed solely of lead would necessarily be extremely thick, especially adjacent its bottom, in order to support its own weight. Furthermore, it would not be practical, due to the weight of lead, to fabricate the wall sections in any but relatively narrow widths. It is, therefore, necessary to join the individual widths together at a vertical joint in order to fabricate a continuous wall. It is well known, however, that even the most minute crack or opening at any of the joints will allow the radiation to penetrate, endangering personnel.

It is a primary object of this invention, therefore, to provide a relatively light gamma ray protector panel.

It is another cardinal object to provide a movable X-ray shield that will be "radiation tight" at its joints.

It is another object and accomplishment of the instant invention to set forth a protective wall panel that is relatively economical.

Still another object is to describe an X-ray shield arrangement that can be erected even by unskilled personnel in substantially short periods of time.

An ancillary object of this invention is to describe X-ray protector panels which may be erected to create control booths, walls, rooms, room dividers, etc., while utilizing only a minimum of special fabricated components.

With these objects in view, the invention consists of the novel features of construction and arrangement of parts which will appear in the following specification and recited in the appended claims, reference being had to the accompanying drawings in which the same reference numerals indicate the same parts throughout the various figures and in which:

FIG. 1 is a fractional view in perspective of one form of the radiation shield assembly erected in place.

FIG. 2 is a horizontal sectional view taken substantially through the center of one typical form of a vertical panel installed in place.

FIG. 3 is a horizontal sectional view taken substantially through the center of a typical 180 degree panel joint.

FIG. 4 is a horizontal sectional view taken substantially through the center of a typical angle joint.

FIG. 5 is a horizontal sectional view taken substantially through the center of a 90 degree panel joint.

FIGS. 6 and 7 are typical plan views of two of the many possible panel layouts.

FIG. 8 is a plan view of one of the floor or top connecting channels.

FIG. 9 is a view taken substantially along the line 9-9 of FIG. 2.

Referring to the drawings which illustrate what may be for some purposes a preferred embodiment of the invention, there is illustrated a gamma ray protective wall panel 10.

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Particularly referring to FIG. 2, which is a horizontal sectional view taken through the center line through a portion of one typical panel, there is illustrated a preferred method of construction. As previously mentioned, lead lining is generally desirable to absorb the gamma rays. If the panel 10 were constructed solely of lead, however, it would either be unmanageable or would not be self-supporting. As illustrated, therefore, in addition to the lead lining 11, there is provided a ribbed outer support 12. It is considered that this ribbed construction is an extremely important facet of this invention. In one preferred embodiment of this device already constructed, the outer support 12 is fabricated of cold rolled steel, but it is to be emphasized that any other relatively strong material may be substituted therefor. As illustrated, the outer support 12 has sections 14 substantially parallel to but spaced a distance from lead lining 11. At other intermediate sections 15, the outer support is substantially parallel to but in intimate contact with the lead lining 11. Each of the sections 14 and 15 are connected to its adjacent section by relatively smooth tapering portion 16. It will be further noted that in the preferred form of the construction, lead lining 11 is encased by two of the outer supports 12 and 12A which are mirror images of each other.

This unique and novel construction and arrangement provides a panel having a center lead lining 11 suitable to absorb gamma rays. The lead lining, however, may be held to a minimum in that it does not serve in a structural capacity; the outer supports 12 and 12A being utilized to carry the major weight of the panel. The extreme matching ends of outer supports 12 and 12A may be rigidly joined by any suitable means, such as welding, clamps, fasteners, or the like. For this purpose they may have relatively short parallel and touching sections 18 and 18A. It will be noted, however, that the lead lining 11 is continued to each of the ends of the panel 10 with a small offset to avoid interference with the touching sections 18-18A. The panels 10, for ease of shipping and erection, will generally be constructed in relatively short lengths. They will be installed and joined together to other panels at the erection site in a manner to be described in detail hereinafter.

In FIGS. 3, 4, and 5 there are disclosed typical forms of connecting joints. As previously mentioned, it is imperative that any joints be "radiation tight" to insure the complete safety of the operating personnel. This is accomplished readily by the construction illustrated in FIG. 3. It will be observed that each of the joints contain a double and generally parallel series of lead linings 20 and 21. Both sides of each of the lead linings 20 and 21 will be in intimate contact with supports 22 fabricated of a structural material such as steel or the like.

For an 180 degree joint, therefore, there will be provided lead linings 20 and 21 supported and encased on their inner surfaces by double U-shaped members 25 and 26, with the bottoms of the U's in touching contact.

The outer extremities of the lead linings 20 and 21 are in touching contact with parallel structural supports having extending U-shaped edges 28 to surround and thereby lock the external edges of lead linings 20 and 21 and U-shaped supports 25 and 26.

Referring to FIGS. 4 and 5, it will be apparent that similar connecting joints may be fabricated to connect panels 10 at any angle, merely by inserting a suitable angle channel 30 between adjacent legs of the U-shaped members 25 and 26. The remainder of the construction is as previously described except that the lead linings 20 and 21 and the outer supports 22 will be fabricated at the appropriate angle.

It will readily be observed that gamma radiation, which

will travel only in a relatively straight path under normal circumstances, will not be able to penetrate any of the above mentioned joints. This safety factor is increased by the double lead lining 20 and 21 surrounding the central lead lining 11 on each joint.

In order to insure the rigid connection and clamping of the individual panels and connecting joints, floor and top locating channels will generally be provided. It may be preferable to fabricate these relatively simple and inexpensive channels separately for each installation in a shape conforming to the desired finished layout.

As illustrated particularly in FIG. 8, the floor and top channels 40 and 41 consist merely of elongated U-shaped members 50 having projections 51 to engage and lock to the supporting members 12 and 12A of the panels 10. FIG. 9 illustrates one of the sections 12 locked in place.

The floor channel, pre-fabricated in a shape as illustrated for example in either FIG. 6 or FIG. 7, or in any other well known shape, is located and fastened to the floor. Each of the panels 10, and their connecting joints are set in place in the floor member 40. It will be apparent that this can be accomplished by any unskilled worker in a relatively short period of time. It will then only be necessary to enclose the top of the panels and their connecting joints by the top channels 41 to complete the structure and the construction.

Special channels or connections for fastening walls, or braces to support the panels to nearby walls can be provided in special cases.

Furthermore, as illustrated at 45 in FIG. 1, one or more of the panels may have an observation opening fitted with lead glass.

Should it become necessary to disassemble or remove the wall or any portion thereof to replace any individual panel or joint, it will only be necessary to remove the top channel 41.

It should, of course, be noted that the top and bottom channels 40 and 41 may be joined to the panels and joints by any well known fastening or connecting means.

The above should suffice to impart a clear understanding of the invention.

It should be reiterated, however, that the essence of the invention is a configuration of the ribbed outer support 12. Were it not for this special ribbed construction secondary supports would be necessary to support the relatively heavy lead lining 11. In addition to the other

benefits previously noted this allows an economy in the saving of material and ease of transportation and erection of the resulting lighter but stronger assemblies.

While there are above disclosed but a limited number of embodiments of the structure and product of the invention herein presented, it is possible to produce still other embodiments without departing from the inventive concept herein disclosed, and it is desired therefore that only such limitations be opposed on the appended claims as are stated therein, or required by the prior art.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. An X-ray shield construction comprising at least a first and a second protective panel, each constructed of a first and a second material, said first material being relatively dense to block the passage of X-rays, and said second material being relatively strong to support said first material, said second material being ribbed whereby said second material will have added structural strength, said first and said second protective panels being angularly disposed, and radiation proof joint means connecting confronting edges of said first and said second protective panels, said joint means having a first layer of dense material partially overlying one side of said first protective panel and a second layer of dense material partially overlying said other side of said first protective panel and a third layer of dense material partially overlying one side of said second protective panel and a fourth layer partially overlying said other side of said second protective panel.

2. An X-ray shield construction as set forth in claim 1, wherein said first and said second layers of said joint means are each spaced from and parallel to said first material of said first protective panel, and said third layer and said fourth layer of said joint means are spaced from and parallel to said first material of said second protective panel.

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