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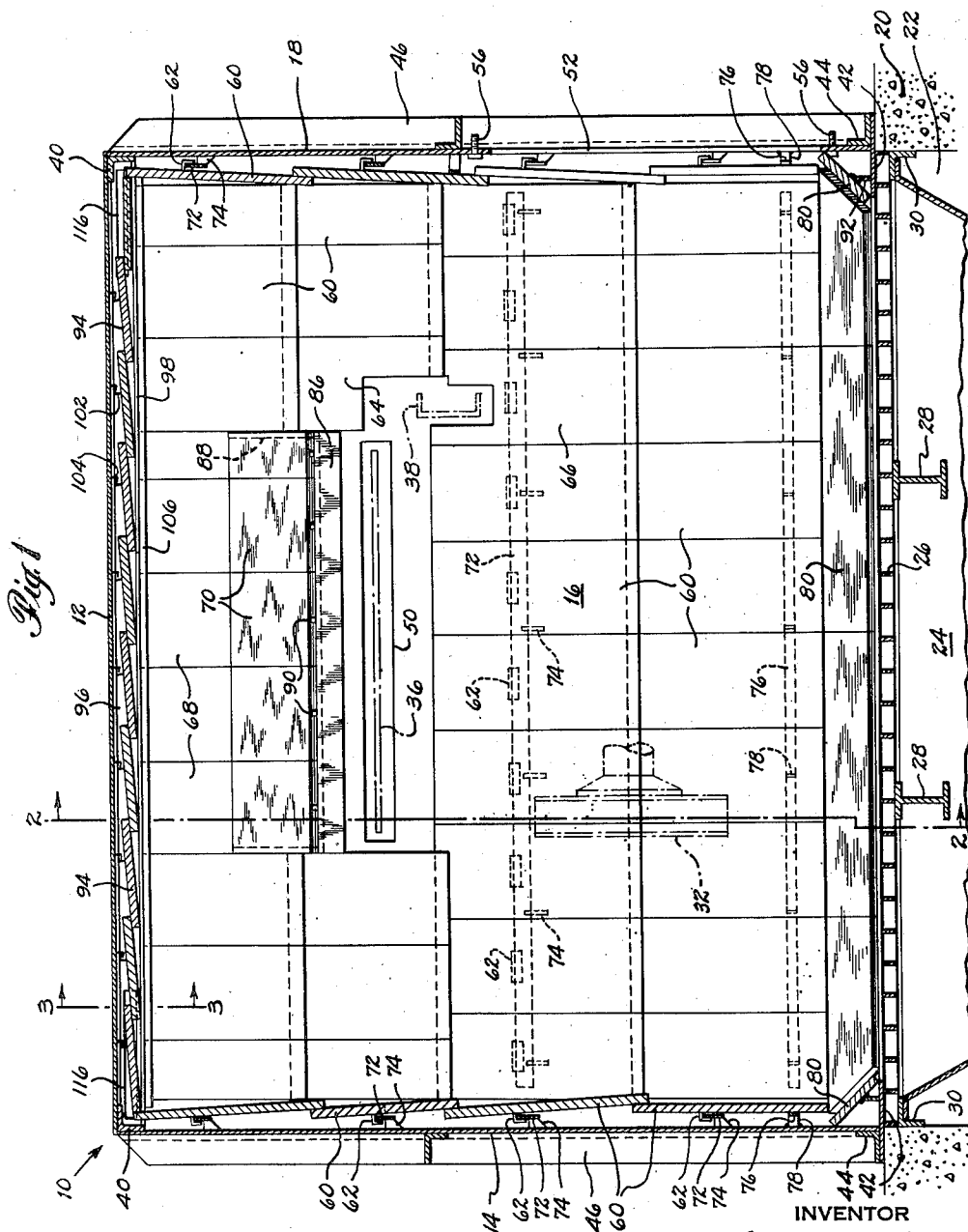
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2,478,153

LINING FOR BLAST CABINETS AND THE LIKE

Filed Oct. 8, 1947

4 Sheets-Sheet 1



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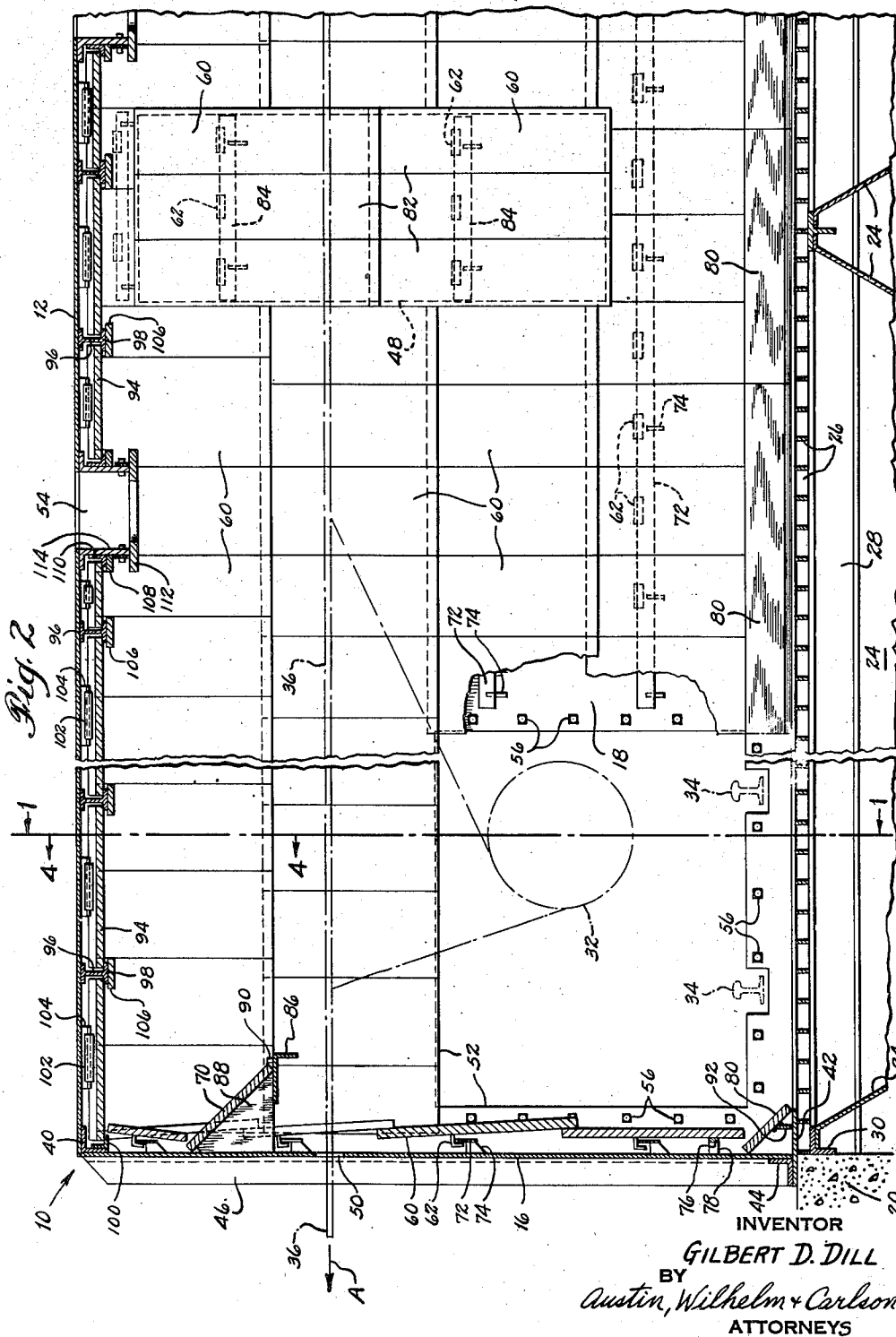
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Fig. 3

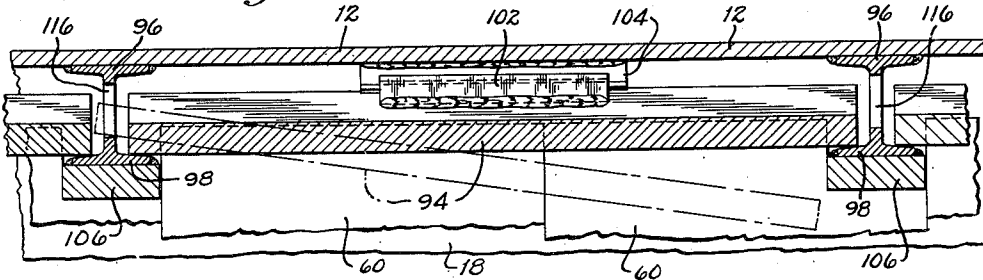
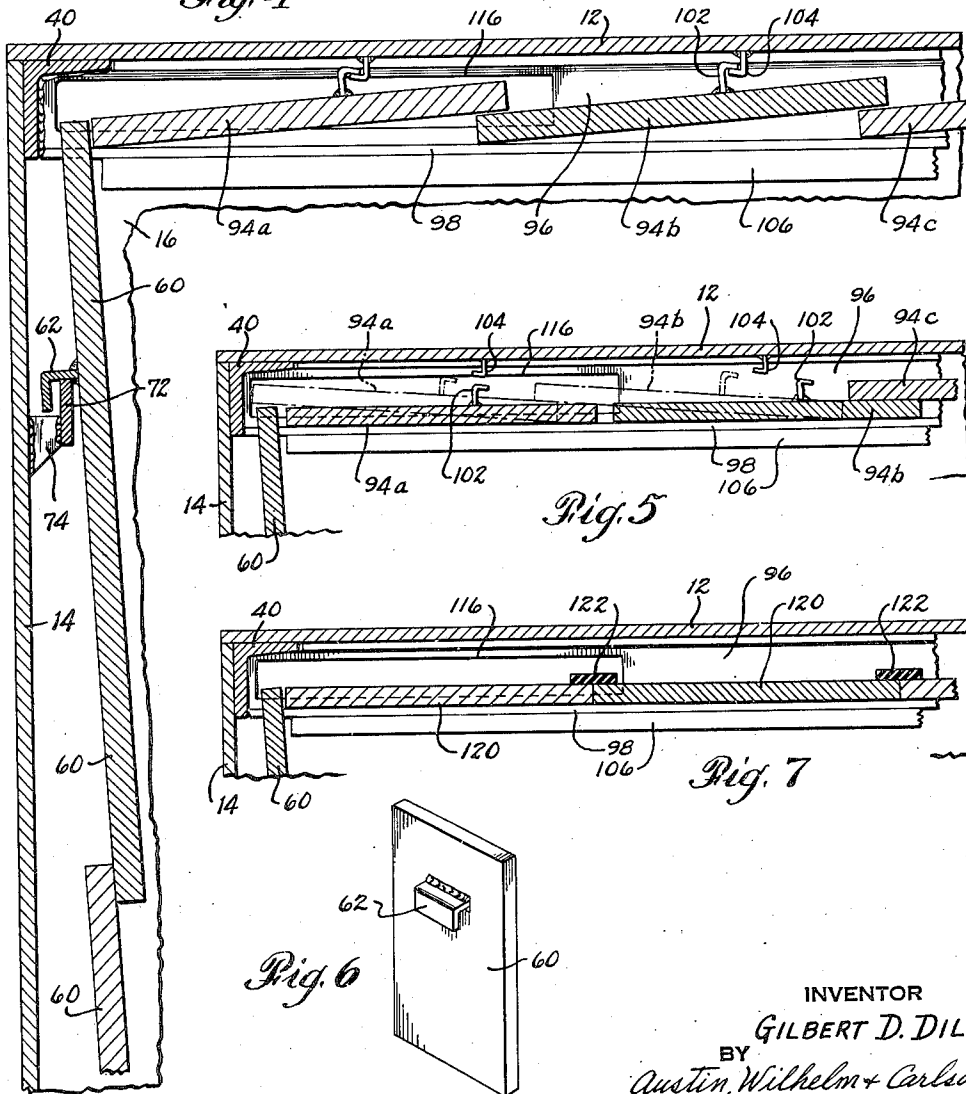


Fig. 4



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Fig. 8.

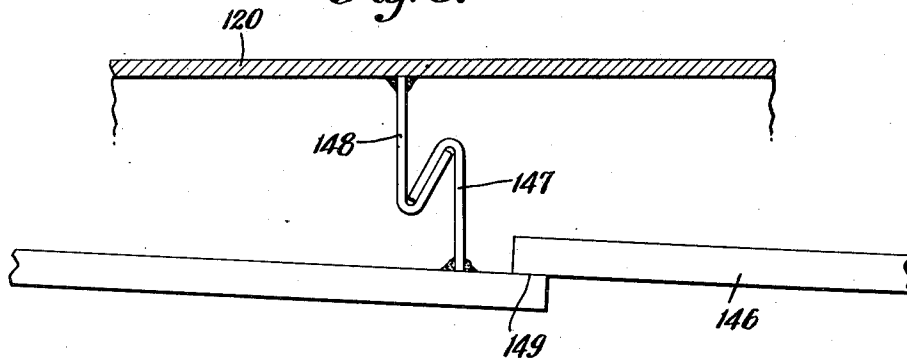
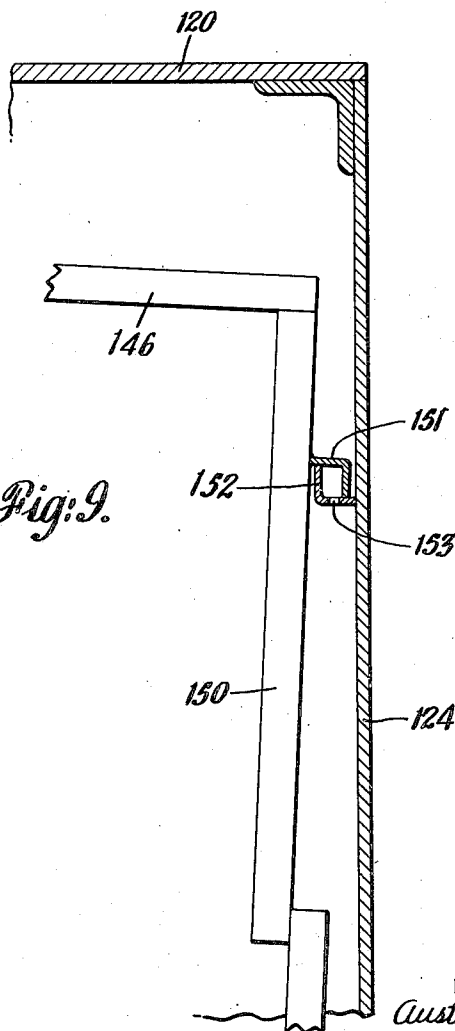


Fig. 9.



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LINING FOR BLAST CABINETS AND
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2 Claims. (Cl. 51—9)

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The invention relates to blasting or cleaning equipment, and more particularly to a protective lining for the cabinet thereof.

This application is a continuation-in-part of application, Serial No. 637,923, filed December 29, 1945, which issued as Patent No. 2,465,360, dated March 29, 1949.

A common trouble in blasting or cleaning equipment is the wearing of the cabinet side walls and ceiling due to action of the abrasive or other blasting material. Such material may strike the cabinet walls directly from the throwing wheels or other blasting equipment or it may ricochet from the work being processed or from other portions of the equipment in the room.

General objects of the invention are to provide a lining which is sectional, and readily replaceable, and adapted to cover variably shaped areas, and to protect areas adjacent the various service and other openings necessary to have in the cabinet.

According to a preferred embodiment of the invention, the vertical cabinet walls may be provided with a series of horizontal rails spaced from the walls by suitable brackets on which may be hung the several removable wear plates. Each wear plate may comprise a relatively heavy plate having a hook secured to the back face thereof and adapted to engage over the wall rails. The plates in any horizontal row have their side edges in abutting relation and each upper row overlaps the next lower row forming a clapboard or shingle-like lining.

According to a preferred form of the invention the cabinet roof may have a similar overlapping construction. If desired, the overlapping rows of plates may be placed between I-beams, resting on the lower flanges thereof; suitable wearing material is welded to the underside of the lower flanges to protect the exposed parts of the I-beams. The I-beams may have openings in the webs thereof to facilitate removal of the roof plates. The roof plates may also have hooks near an overlapping edge thereof engaging similar hooks suspended from the ceiling to prevent accidental shifting of the plates.

Provision is also made for preventing trapping of the abrasive behind the wear plates. The overlapping adjacent margins of the ceiling plates may be slightly spaced to allow any abrasive getting in between the plates to work itself out. The horizontal side wall rails are spaced from the outer cabinet walls to permit free flow, of any abrasive getting behind the wear plates, down to the bottom of the cabinet where the

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abrasive is diverted into the usual floor hoppers.

The invention also consists in certain new and original features and combinations hereinafter set forth and claimed.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, and the manner in which it may be carried out, may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part hereof, in which:

Fig. 1 represents a transverse cross section 15 through a typical blasting cabinet looking towards the end wall in which the work exit is formed, most of the work supporting structure and blasting mechanism being omitted for simplicity of illustration;

Fig. 2 is a longitudinal section, partly broken away, taken on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary section taken on the line 3—3 of Fig. 1, showing the ceiling plates supported by I-beams;

Fig. 4 is an enlarged fragmentary section taken along line 4—4 of Fig. 2 and showing a portion of the ceiling and front wall of the cabinet and its lining;

Fig. 5 is a section similar to Fig. 4 on a slightly reduced scale, showing certain successive steps for the removal of the ceiling plates;

Fig. 6 is a rear view, in perspective, of a typical side and end wall lining plate;

Fig. 7 is a section similar to Fig. 4 but showing a modified manner of placing the ceiling plates on the I-beams;

Fig. 8 is a detail showing modified roof clapboard plates and manner of hanging; and

Fig. 9 is a detail showing modified side clapboard plates and manner of hanging.

In the following description and in the claims, various details will be identified by specific names for convenience, but they are intended to be as generic in their application as the art will permit.

Like reference characters denote like parts in the several figures of the drawings.

In the drawings accompanying and forming part of this specification, certain specific disclosure of the invention is made for purposes of explanation, but it will be understood that the details may be modified in various respects without departure from the broad aspect of the invention.

Referring now to the drawings and more particularly to Figs. 1 and 2, the installation in the

form shown comprises in general a cabinet 10 having a roof 12, rear wall 14, end walls 16 (one only of which is shown) and front wall 18. The cabinet 10 is built on a foundation 20 and completely covers a pit 22 in said foundation and in which is mounted the reservoir or hoppers 24 for receiving the spent abrasive as it falls from the work being processed. A floor grating 26, mounted on beams 28 and angle bars 30, forms a perforate cover for the hoppers 24 and a floor to the cabinet 10. The floor grating 26 and its supporting structure provides a floor level for the use of maintenance men when working in the cabinet and also means for mounting the usual equipment and structural units associated with abrasive blasting apparatus of the type referred to in the copending application hereinbefore mentioned.

Certain portions of this equipment are diagrammatically indicated in Figs. 1 and 2 by dot and dash lines; such portions comprise a motor driven abrasive throwing or blast wheel 32, tracks 34 to carry the blast wheel motor (not shown) in and out of the cabinet, the skelp or other work 36 being processed and one of the beams 38 upon which may be mounted the work supporting and guiding structures. The direction of work progress through the cabinet is indicated by the arrow A. These diagrammatically indicated elements 32, 34, 36 and 38 are shown merely to reveal approximate relative position of one form of blasting set-up which may be used in conjunction with the illustrated form of cabinet.

The cabinet 10 may be of knock-down welded construction to facilitate handling in shipping and erection. The walls 14, 16, 18 and roof 12 may be fabricated of steel plate about one-half inch in thickness and have heavy structural steel reinforcing members where needed, such as wall and roof-joining angle bars 40, floor sill 42, externally disposed wall and sill-joining angle bars 44, and appropriately spaced vertical members 46.

Various openings into the interior of the cabinet may be provided in the several walls and roof as, for example, a service door 48, work exit 50, blast wheel apparatus entrance 52 and conduit aperture 54. Sealing of the various openings against the escape of flying abrasive may be accomplished by several devices such as rubber curtains (not shown), a shroud plate forming part of a blast apparatus (not shown) and adapted to cover apparatus entrance 52 when the apparatus is in operating position or other means well known in the art. In the case of the apparatus entrance 52, bolts 56 may be fixed at spaced intervals about the borders of the entrance and project outwardly to permit securing of the aforementioned shroud plate thereto.

The cabinet 10 is sufficiently roomy to insure the desired decrease in intensity of rebounding abrasive particles and all the exposed interior surfaces of the walls and roof are protected by a lining of thick steel wearing plates forming an overlapping or clapboard effect sheathing as will now be described.

Referring to Figs. 1 and 6, the several lining plates 60 are generally rectangular in shape; each has a short angle bar or hook 62 welded or otherwise secured to the rear face about one third the plate length from the top edge and equidistant from each side edge. The hooks 62 permit the plates 60 to be hung on the walls of the cabinet without the use of bolts, thus providing means for rapid and easy removal and replacement of

individual plates as the need may arise. The location of the hook 62 in relation to the center of gravity of the plate 60 is such that, when the plate is hung on the cabinet wall, its lower margin tips toward the wall and, when in overlapping relation to the plate directly below, this lower margin rests against, and is supported by, the upper margin of the lower plate.

Generally speaking, the plates 60 may be approximately 12" wide by 24" long by 1" thick and weigh in the order of 80 to 100 pounds; however, plates which border such cabinet openings as work exit 50 may be varied in size and shape to accommodate themselves to the contour of such openings and associated superstructure. Thus, plates 64, 66 are notched out to make room for beam 38 and plates 68 are shortened to permit insertion of eave plates 70 between them and exit opening 50. Other similar variations will be obvious to those skilled in the art, for adapting the plates to particular conditions.

Means for hanging the lining plates on the cabinet walls 14, 16, 18 in horizontal rows and in overlapping relationship are provided and, as embodiments, comprise series of hanger rails 72 horizontally disposed along the walls and secured thereto but slightly spaced therefrom by bracket plates 74. Rails 72 are structurally continuous along a particular wall for substantially its full length except where said wall may be interrupted by openings, but may, for convenience, be made of adjoining strips.

Each of the hanger rails 72 serves as a support for a horizontal row of lining plates 60; the plate hook 62 is placed over and in back of the rail and each plate abuts its neighbor along its side edges. The rails 72 are placed at various heights along the walls so that the upper and lower margins of the plates underlap and overlap respectively the corresponding margins of the plates next above and below.

The upper portion of the topmost row of wall plates 60 cooperate with the ceiling plates to seal the upper corners of the cabinet. The lowermost row of wall plates 60, having no plates beneath them, are held in spaced relation to the wall by support rails 76 secured to but spaced from the walls by a plurality of bracket plates 78. By this arrangement space may be secured between the walls, wall plates and sill plates 80 whereby abrasive, sifting through the wall clapboard sheathing, may drop into the hoppers 24.

Service openings into the cabinet, such as the door 48, may be provided with individual lining plates 82 and hanger rails 84 so placed as to substantially duplicate the clapboard effect of the wall plate arrangement. The side and top reaches of the group of plates 82, which form a door back, abut, rather than overlap, the adjacent wall plates so that the door may be opened without disturbing the plate arrangement.

It may be desirable to have certain cabinet openings, such as the work exit 50, protected by eave plates placed so that their exposed surfaces are at a sharp angle with respect to the wall and ceiling plates whereby the ricocheting abrasive may be better directed away from such openings. As illustrated, a group of eave plates 70 are supported in an inclined position directly above work exit 50 by having their upper edges bearing against end wall 16 and their lower edges resting on an angle bar 86. Triangularly shaped bracket plates 88, welded to the ends of bar 86 and to the end wall 16, serve both as supports for said bar and as closures for the triangular space created

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between the ends of the group of inclined eave plates 70 and the adjacent vertical wall plates. A stop lug 90 is fixed on the bar 86 in front of each eave plate 70 to hold the plate in its proper position.

To prevent accumulation of spent abrasive on top of floor sills 42 in the lower corners of the cabinet and direct it through the floor grating 26 into the hoppers 24, such corners may be covered by inclined sill plates 80 arranged end to end and having their upper edges bearing against walls 14, 16, 18 and their lower edges resting on floor sills 42. Welded to the underside of each sill plate 80, to insure it against slipping out of place, is a bearing strip 92 so placed that, when sill plate 80 is in its proper inclined position, the bearing strip 92 bears on, and is normal to, floor sill 42.

Referring now to the means for protecting the roof 12 of the cabinet from flying abrasive, a plurality of ceiling plates 94 are arranged and supported in overlapping relationship so as to completely line or sheath the area between roof beams 96 of the inner surface of roof 12, except for such openings 54 in the roof as may be necessary for abrasive conduits and other structure associated with the particular blasting apparatus which may be in use in the cabinet.

As embodied, I-beams 96 are welded or otherwise secured on the underside of roof 12 parallel to each other and transverse of the cabinet from rear wall 14 to front wall 18; I-beams 96 are so arranged that the space between adjacent beams 96 accommodates one row of ceiling plates 94. Support for the ceiling plates 94 is afforded by the lower flanges 98 of the I-beams 96; the space between the facing edges of each pair of flanges 98 is less than the length of the ceiling plates 94 which they support. Each end row of ceiling plates 94 adjacent end walls 16 require additional support along one edge, which may be provided by an angle bar 100 welded to the vertical flange of corner bar 40 of the cabinet structure.

Overlapping of the ceiling plates 94 in each row may be accomplished simply by laying the margin of one plate over the adjacent margin of the following plate; but in certain cases where excessive vibration may occur during blasting operations it is desirable that possible shifting of the plates out of position be prevented. To this end each ceiling plate 94 may have a hook bar 102 (Figs. 3-5) fixed to its upper surface and nearer that margin of the plate which is to overlap the following plate. Hook bars 102 engage hooks 104 which are welded to the under surface of roof 12.

The engaging hooks of hook bars 102 and hooks 104 are formed at a slight incline to the horizontal in such direction that any force tending to disengage them, and thus shift the plates out of position, is resisted by the weight of the plates. The size of hooks 102, 104 may be such that the overlapping margins of adjacent plates may be either in very light contact or very slightly spaced from each other as blasting conditions may require.

Since the ceiling plates 94, which are supported on the flanges 98 of I-beams 96, leave the flanges exposed to blast action, heavy steel strips 106, slightly wider than the flanges 98, and extending the full length of the I-beam 96, may be welded to the underside of flanges 98, thus fully shielding the flanges against abrasive action.

Openings in the roof 12, such as conduit opening 54, may be protected in a similar manner;

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wear strips 108 are welded to plate support angle bar 110; and apertured wear plate 112 has lugs for bolting to the depending flange of the members 114 which border the opening 54.

Special provision is made for assembling and removing the ceiling plates 94 with respect to their supporting I-beams 96; this is necessary because the distance between the webs of two adjacent beams is purposely made too small to permit the plates to be shifted the amount necessary to clear either plate edge from its supporting flange 98. As embodied, a rectangular hole 116 is formed in the web of each I-beam 96 (Fig. 3), at each end thereof, and having a length and width sufficiently greater than the width and thickness of the associated ceiling plates to permit the plates to be assembled or removed by a "snaking in or out" process as will now be described.

Referring to Figs. 3, 4, 5, it will be assumed that same intermediate ceiling plate 94b, between the end plates of a ceiling row is to be removed. It is first necessary to remove end plate 94a before intermediate plate 94b can be removed.

The end plate 94a is first lifted upwardly on that side abutting wall plate 60 and shifted to the left so that said side overlaps the top edge of wall plate 60, as indicated by dot-and-dash lines in Fig. 5. In doing this the plate hook 102 is disengaged from hook 104 and the side of plate 94a, which overlapped plate 94b, is freed therefrom and is dropped to the flanges 98 of beams 96 as shown in dot-and-dash lines in Fig. 5.

Next, the left margin of plate 94b is raised over the adjacent margin of plate 94a and shifted to the left, unhooking it and in turn freeing its right hand side from plate 94c and permitting it to be dropped upon the beam flanges 98, as shown in dot-and-dash lines in Fig. 5.

The left margin of plate 94c is now raised and plate 94b then shifted to the right, which brings plate 94b partially beneath plate 94c, completely off and away from plate 94a and resting flat upon beam flanges 98 in the position shown in solid lines in Fig. 5.

Plate 94a may now be shifted to the right so as to rest flat on beam flanges 98 with its end opposite the hole 116 in the web of beam 96, as shown in solid lines in Fig. 5. Plate 94a can now be lifted slightly at its left margin (Fig. 3) and shifted a sufficient distance through web hole 116 to free its opposite margin from the supporting flange 98, whence it may be dropped past the flange, shifted to the right and entirely removed from the supporting structure.

Similarly, plate 94b (and any additional plates) may now be moved to a position opposite web hole 116 and removed in a like manner. Replacement of plates may be made in a similar manner but in a generally reverse order. Since a web hole 116 is provided at each end of beams 96, it is obvious that comparatively few plates have to be shifted to permit removal and replacement of a centrally disposed plate in any row.

In certain cases, or in certain specific areas, a cabinet ceiling may not be subject to the maximum deleterious action of flying abrasive so that the overlapping of ceiling plates to give maximum wearing qualities may be unnecessary; in Fig. 7 there is shown a modified manner in which these plates may be arranged. As embodied, plates 120 are simply laid in line, flat upon the beam flanges 98 and abut one another along their side edges.

Rubber strips 122, about one-half inch thick by two or three inches wide, may be placed along the top surface of the plates 120 so as to cover the joint formed by the abutting edges, thereby sealing the joint and reducing to a minimum any pitting action of the flying abrasive.

Figures 8 and 9 illustrate a modified construction. Referring to these figures, the roof plates, indicated in general by 146 in Fig. 8, have hooks 147 welded along one margin of the plate. These hooks are hung on depending brackets 148 welded to the roof wall 120 of the cabinet. It will be noted that the hooks 147 are located near one edge of the plate and the other end of the liner plate rests upon the adjoining margin 149 of the next plate forming a lap joint at this point.

The assembly of side plates is indicated in Fig. 9, each side plate being indicated by 150. The side plates have angle clips 151 welded thereto engaging over angles 152 welded to the side walls or end walls (indicated by 124) of the cabinet. The wall angles 152 have openings 153 in the bottom thereof for reasons discussed hereinafter. The upper edges of the side plates 150 may form supports for adjacent roof plates 146, if desired, as indicated.

In both roof plates and side and end wall plates the adjoining liner plates in each row have butt joints; it is only the plates of adjoining rows that have lap joints; thus being similar to ordinary outdoor house roof shingles. In the vertical or upstanding walls the butt joints thus extend vertically and the lap joints extend in line horizontally.

It has been found that the clapboard construction withstands the action of the abrasive better than horizontal butt joints which have a tendency to permit the abrasive to wear grooves therein at the joints. The openings 153 in the side angles 152 permit the draining or dropping of the abrasive which may become lodged in the angles and thus reduces inactive abrasive.

The foregoing description and accompanying drawings thus disclose efficient, economical and highly adaptive instrumentalities for lining the interior walls and roofs of abrasive blasting equipment cabinets. These walls and roofs may assume a variety of sizes and shapes; the above disclosed lining is simple to make and easy to handle; the lining is adaptive to an overlapping or

clapboard arrangement along cabinet walls and ceiling, which reduces to a minimum abutting joints in those areas wherein the wearing action of flying blast material is greatest.

While certain novel features of the invention have been disclosed herein, and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. In a blasting apparatus, a cabinet having a roof, parallel I-beams forming part of said roof, rows of wear plates between said I-beams and resting on the lower flanges thereof, wear strips secured to the lower surface of said lower flanges, the plates in each row overlapping the adjoining margin of the adjoining plate, each plate having a hook on its back side near the margin which overlies the adjoining plate, said roof having hooks engaging said plate hooks, certain of said I-beams having openings in the webs thereof to facilitate removal of wear plates between the I-beams.

2. In a blasting apparatus, a cabinet having enclosing walls including a roof, a plurality of hooks depending from said roof, a roof lining comprising a plurality of rows of plates, the plates in each row having abutting relationship, the plates in adjoining rows having overlapping relationship, hooks attached to said plates near longitudinal edges thereof interlocked with said roof hooks, the longitudinal margins of the plates opposite the hooks being free of hooks and resting on top of the margin of the adjoining row of plates.

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