This invention relates to blast machines, such as are used for abrading, polishing, peening, cleaning, surface hardening, and the like. Specifically, the invention relates to improved means for sealing the passageways or openings through which workpieces are admitted or discharged from the chambers or enclosures within which the blasting operations are performed by machines such as those shown for example in U.S. Patent 2,343,991, 2,460,989 and 2,924,911.

Such blasting machines are used for example in de-bottoming, descaling, deflashing, or cleaning and polishing of weldments, castings of metal and other materials, as well as for shot-peening and similar operations, requiring the use of effectively sealed cabinets or enclosures surrounding the blasting operations to prevent loss or waste of the shot or other abrasive media. It has long been a problem to effectively seal access holes and workpiece inlet/outlet openings in such machines especially for working on long workpieces which must be progressively fed through the blast chamber, or when fed by a conveyor moving workpieces continuously through the blasting chamber, and previously developed mechanical sealing means such as flaps of rubber, labyrinth baffles, and so forth, all have suffered shortcomings. The problem is especially difficult when using relatively heavy iron or steel shot as the blasting media, because under such circumstances the prior art seal devices do not perform efficiently even when new, and tend to deteriorate in use under the impact and abrasion effects of the blasting particles.

In my recently issued Patent No. 2,924,911, I disclosed an improved type of seal for such purposes, which I call a magnetic type seal; but it is an object of the present invention to provide a still further improved type of magnetic seal means for sealing blast enclosures through which are moving workpieces carrying conveyors of certain types of long workpieces such as H beams, channels, I beams, and the like, which will operate in improved manner to prevent escape of the blasting media from the enclosures.

Another object of the invention is to provide an improved sealing means as aforesaid which comprises a sealing curtain or novel form which is self-sustaining and conformable with improved efficiency to a wide variety of moving conveyor or workpiece shapes.

Other objects and advantages of the invention will appear from the specification hereafter and the accompanying drawings wherein:

FIG. 1 is a vertical sectional view of a shot blasting machine utilizing one form of the sealing means of the invention;

FIG. 2 is a fragmentary sectional view, on enlarged scale, taken on line II-II of FIG. 1;

FIG. 3 is a fragmentary sectional view taken along line III-III of FIG. 2;

FIG. 4 is a sectional view taken on line IV-IV of FIG. 3;

FIG. 5 is a view corresponding to FIG. 2 but of another form of sealing means of the invention;

FIG. 6 is a section taken on line VI-VI of FIG. 5;

FIG. 7 is an enlarged scale sectional view of one of the sealing components, taken on line VII-VII of FIG. 8 and illustrating the installation thereof;

FIG. 8 is a fragmentary longitudinal sectional view, partly in elevation, of a seal component of the invention;
60 comprising bristles of magnetizable spring steel or the like arranged in staggered gang relation; the bristles being rooted in clamp devices 62 carried in channels 64 which are spaced apart by steel bars 66. Thus, the assemblies are readily welded or otherwise suitably fastened to the aperture frame structure 68. As explained hereinabove in connection with FIGS. 1-3, the bristles of the brushes 60 may be magnetized by mounting permanent magnets 70, 72, 74 above and below the top and bottom sills respectively of the frame 68; and by providing top and bottom pole pieces 76, 78, and side pole plates 80-82. Insulation check plates of aluminum alloy or the like as described at 25—35 may also be provided for the workpiece loading aperture; and being of non-magnetic material will not interfere with proper flexing motions of adjacent bristles of the magnetizable curtain.

As shown in FIG. 10, the proper magnetic curvature covering the workpiece loading aperture 84 of the blast cabinet may be provided with a supplemental vestibule 85 enclosing a plurality of shot-clean-off brushes 86. The brushes 86 may comprise bristles formed of nylon or the like, arranged as in FIG. 2, and returned to the blast operation by any suitable means.

It will of course be appreciated that although only a few forms of the invention have been shown and described in detail, various changes may be made therein without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. A blast finishing machine comprising, a casing having a workpiece reception opening, a blasting machine projecting machine discharging magnetizable media into the interior of said casing, and a curtain of flexible magnetizable members traversing said opening and projecting a magnetic field across the opening, whereby said blast media will be entreated by said magnetic field and agglomerate on said flexible members to form a wall of media particles clinging together in such manner as to close said opening against passage thereof and/or withdrawal thereof.

2. A blasting machine comprising, a casing having a workpiece reception opening at opposite sides thereof, and projecting machine discharging magnetizable media into the interior of said casing, whereby said blast media will be entreated by said magnetic field and agglomerate on said flexible members to form a wall of media particles clinging together in such manner as to close said opening against passage thereof and/or withdrawal thereof.

3. A blasting machine comprising, a casing having a workpiece accommodation opening, a blasting machine projecting machine discharging magnetizable media into the interior of said casing, and a curtain of flexible magnetic members traversing said opening and projecting a magnetic field across the opening, whereby said blast media will be entreated by said magnetic field and agglomerate on said flexible members to form a wall of media particles reinforced by metallic members permitting penetration and/or withdrawal thereof.

4. A machine comprising a casing enclosing projectile media particles.
magnetizable particles and having a workpiece reception opening, magnetizable flexible bristle means extending across said opening, and magnet means disposed adjacent said opening and operable to magnetize said bristles, whereby projectile media moving into the range of said magnetized bristles will become arrested thereby and agglomerate to form a wall of said media particles clamping together in such manner as to block passage therethrough of other projectile media particles while permitting relative movement between said machine and said workpiece.

5. A blast finishing machine comprising, a casing having a workpiece reception opening, a blasting media projecting machine discharging magnetizable media into the interior of said casing, magnetizable flexible bristle means extending across said opening, and magnet means disposed adjacent said opening and operable to project a magnetic field extending from the marginal edge of said opening to the workpiece disposed therein, whereby media moving into the range of said magnetic field will become arrested thereby and agglomerate to form a seal of said media particles clamping together in such manner as to block passage therethrough of other projectile media particles while permitting relative movement between said machine and said workpiece.

6. A blast finishing machine adapted for relative movement operation upon a large workpiece surface, said machine comprising, a casing having a workpiece reception opening, a blasting media projecting machine discharging magnetizable media into the interior of said casing, magnetizable flexible spindelike members extending across said opening and cooperatively to substantially close the latter and means operable to project a magnetic field extending inwardly from the marginal edges of said opening towards the workpiece when disposed in operative position, whereby projectile media moving into the range of said magnetic field will agglomerate to form a seal of said media particles clamping together in such manner as to block passage therethrough of other projectile media particles while permitting relative movement between said machine and said workpiece.

7. A blast finishing machine comprising, a casing having a workpiece reception opening, a blasting media projecting machine discharging magnetizable media into the interior of said casing, magnetizable flexible curtain media across said opening, magnet means disposed adjacent said opening and operable to establish a magnetic field extending from the marginal edge of said opening towards the workpiece disposed therein and means delivering media into the range of said magnetic field to form a sealing curtain of media particles blocking passage therethrough of other projectile media particles while permitting movement of workpieces relative to said openings.

8. A blast finishing machine comprising, a casing having a workpiece reception opening, a blasting media projecting machine discharging magnetizable media into the interior of said casing, and a curtain of flexible cantilever spine-like fingers across said opening and operable to substantially span the opening, whereby media will become entrained by said fingers and agglomerate to form a wall of said media particles closing said opening against passage therethrough of other projectile media while permitting penetration and/or withdrawal therethrough of workpieces.

9. A blast finishing machine comprising, a casing having a reception opening at one side thereof for a workpiece of a length dimension greater than the width of said machine casing, a blasting media projecting machine discharging magnetizable media into the interior of said casing, curtain means disposed adjacent said opening and operable to project a magnetic field spanning said opening whereby magnetizable media will become entrained by said magnetic field and cling together to form a wall of media particles permitting penetration and/or withdrawal therethrough of workpieces while hugging the workpieces to block passage of other projectile media particles.

10. A blast finishing machine comprising, a casing having a workpiece accommodating opening, a blasting media projecting machine discharging magnetizable media into the interior of said casing, magnetizable wire spring devices mounted to project across said opening, magnet means disposed to bracket said opening and operable to magnetize said spring devices whereby media from within said casing will become entrained by said magnetized springs and agglomerate to form a wall of clamping media particles operable to block passage therethrough of other projectile media particles while permitting penetration and/or withdrawal therethrough of workpieces, the openings through said wall made by passage of workpieces being automatically self-healing.

11. A machine comprising a casing enclosing projectile magnetizable particles and having a workpiece reception opening, flexible bristle means extending across said opening, and magnet means disposed adjacent said opening and operable to project a magnetic field thereover whereby projectile media moving into the range of said bristles will be arrested thereby and agglomerate to form a wall of media particles clamping together in such manner as to block passage therethrough of other projectile media particles while permitting relative movement and withdrawal therethrough of workpieces.

12. A blast finishing machine comprising, a casing having a workpiece reception opening, a blasting media projecting machine discharging magnetizable media into the interior of said casing, and a curtain formed of flexible magnetizable coil springs disposed to span said opening, and means operable to project a magnetic field across the opening, whereby media will become entrained by said magnetic field and said springs and agglomerate to form a wall of media particles clamping together in such manner as to close said opening against passage therethrough of other projectile media particles while permitting penetration and/or withdrawal therethrough of workpieces.

13. A blast finishing machine comprising, a casing having a reception opening at one side thereof for a workpiece of a length dimension greater than the width of said machine casing, a blasting media projecting machine discharging magnetizable media into the interior of said casing, and a curtain formed of flexible magnetizable coil springs disposed to span said opening, and magnetized filler means carried by said casing. Thereafter whereby projectile blast media will become entrained by said said curtain and cling together to form a wall of media particles permitting penetration and/or withdrawal therethrough of workpieces while hugging the workpieces to block passage of other projectile media particles.

14. A blast finishing machine adapted for relative movement operation upon a large workpiece surface, said machine comprising, a casing having a workpiece reception opening, a blasting media projecting machine discharging paramagnetic media into the interior of said casing, a curtain formed of flexible elongate spring devices extending across said opening, and magnet means carried by said spring devices whereby projectile media moving into the range of said magnet devices will agglomerate to form a seal of media particles clamping together in such manner as to block passage therethrough of other projectile media particles while permitting relative movement between said machine and said workpiece.

15. A blast finishing machine comprising, a casing having a workpiece reception opening, a blasting media projecting machine for discharging magnetizable media into the interior of said casing, a plurality of bristle-like magnetizable spring elements secured in cantilever fashion to oppositely disposed portions of said casing defining said workpiece reception opening therein, said spring
elements being of lengths such as to substantially close said opening and to substantially meet along a line extending through the central region of said opening, means mounted on said casing adjacent said workpiece opening for establishing a magnetic field through said spring members tending to align the same across said opening, and means for supporting a workpiece for introduction into said casing through the central region of said opening whereas said spring elements tend to meet.

References Cited in the file of this patent

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2,924,911  Leisner  ______________ Feb. 16, 1960