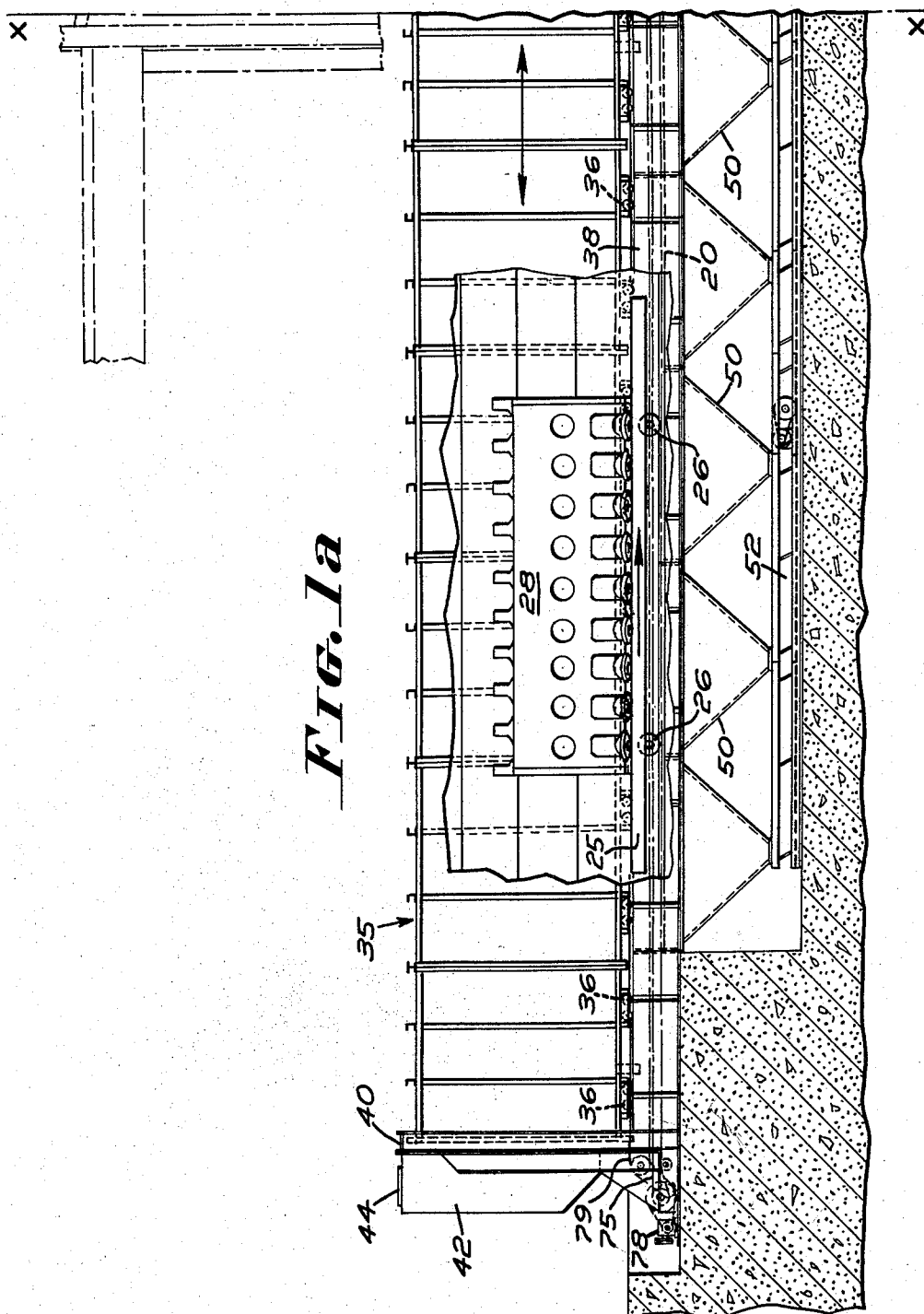


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BLAST TREATMENT APPARATUS

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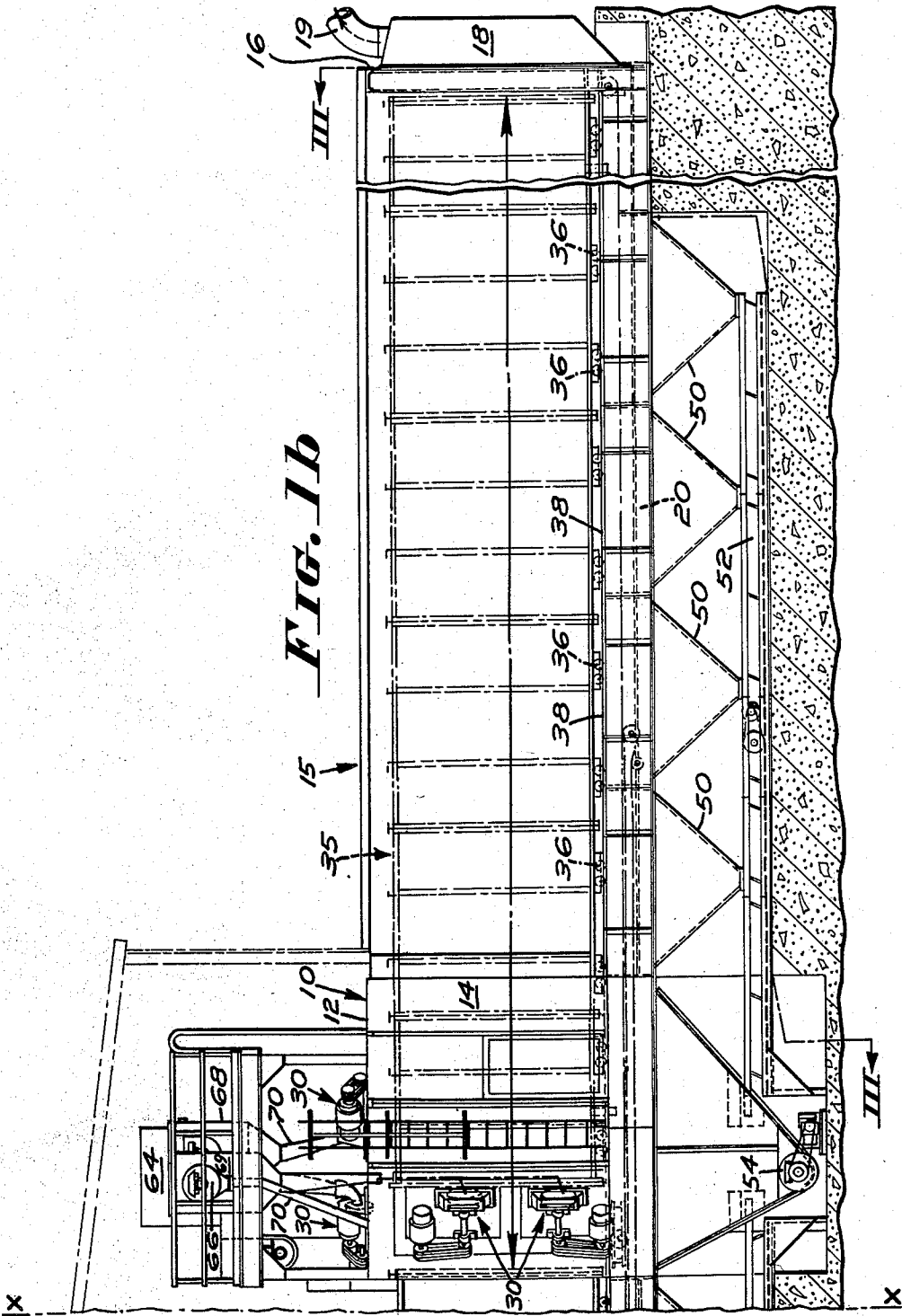
H. F. SCHULTE

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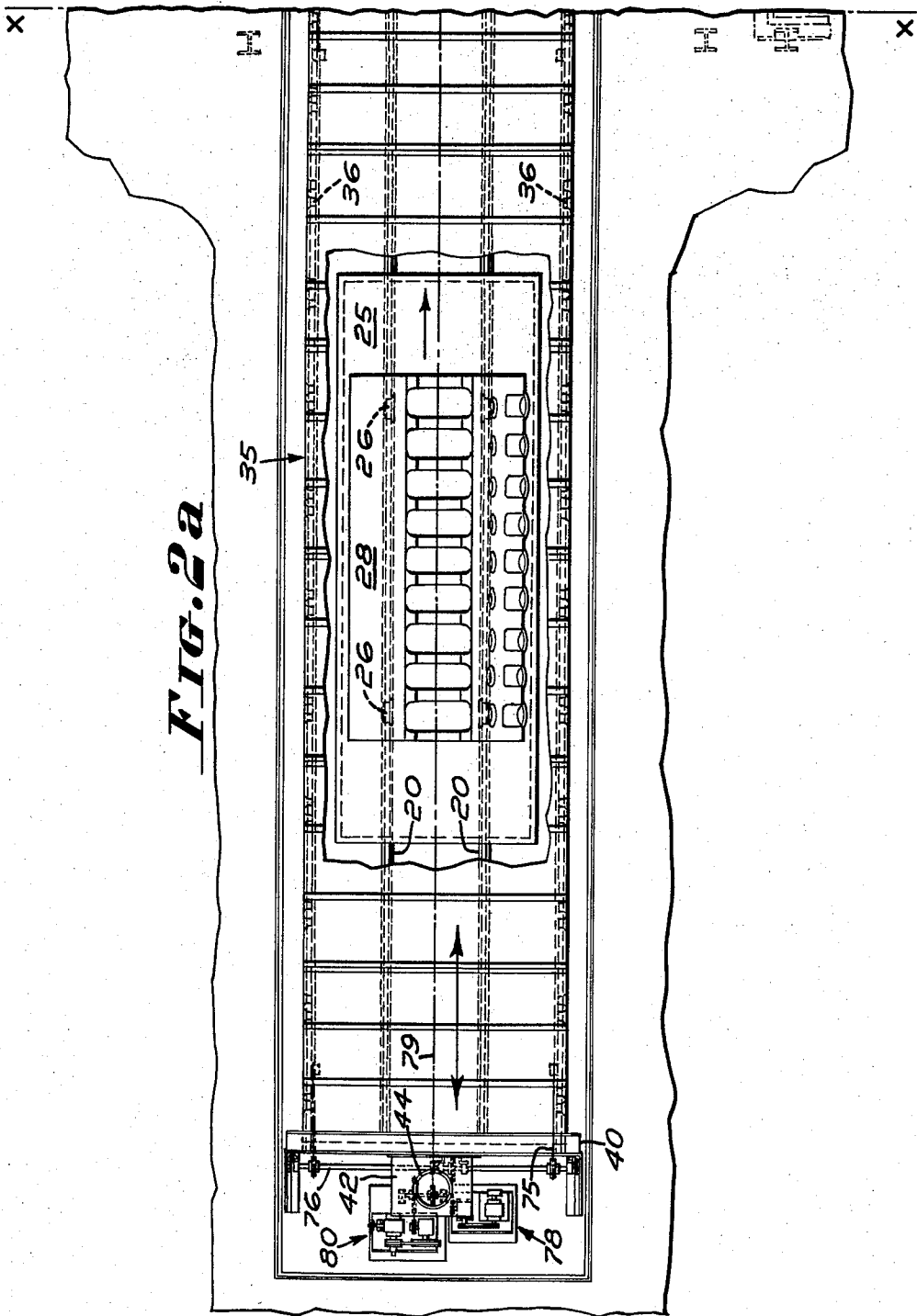
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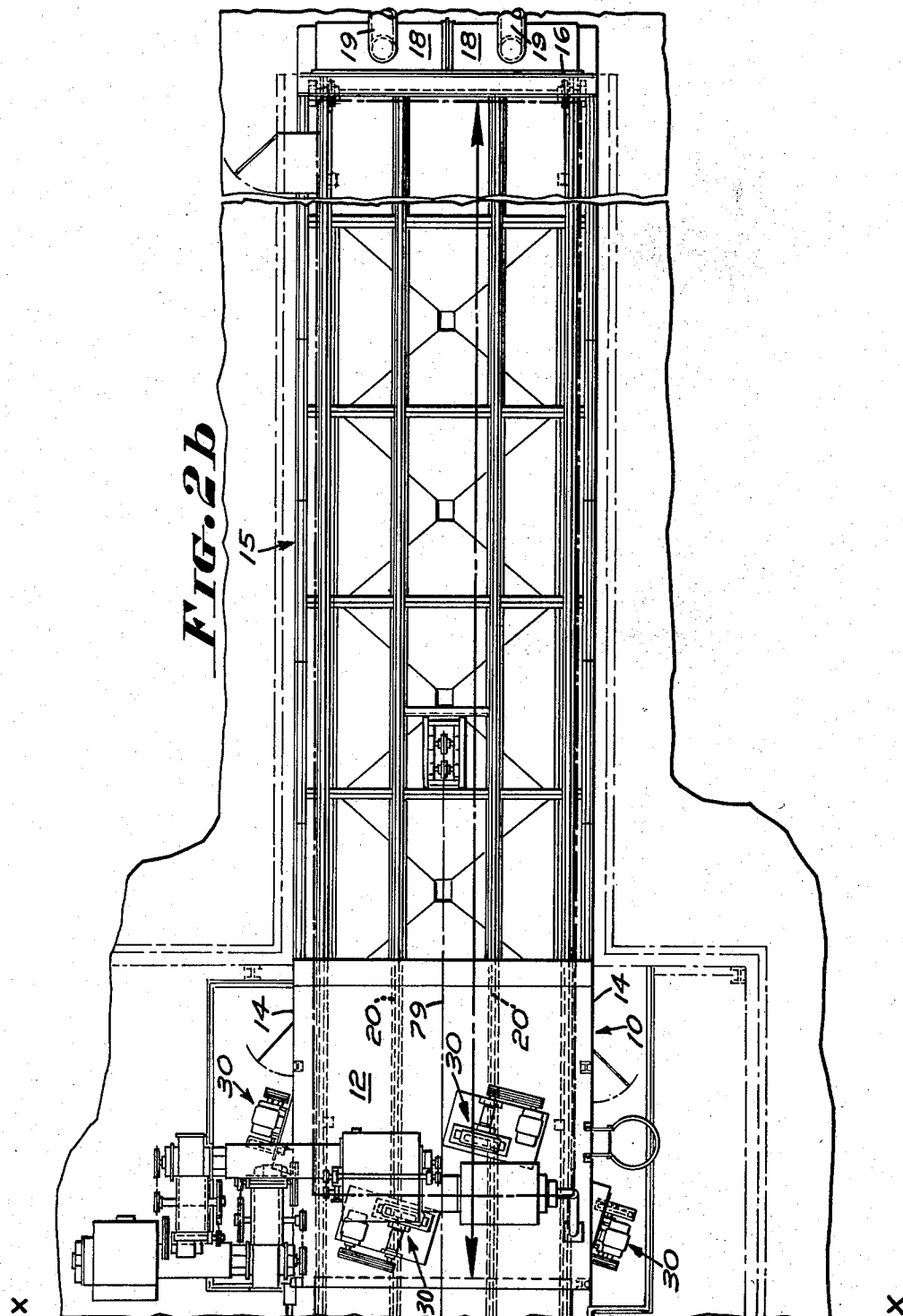
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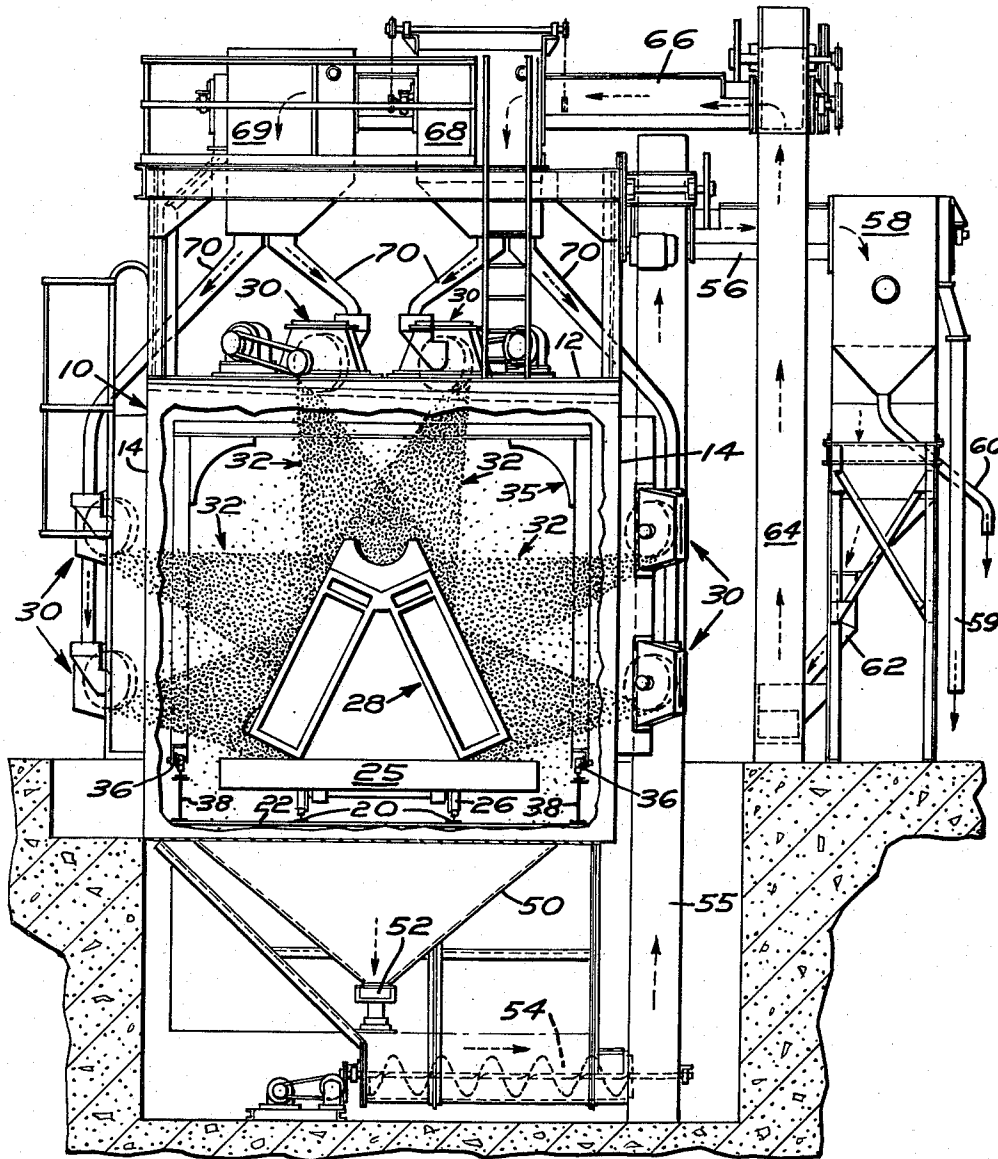
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ELAST TREATMENT APPARATUS

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FIG. 3



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BLAST TREATMENT APPARATUS

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10 Claims. (Cl. 51—14)

This invention relates to blast finishing machines such as are used in the various industries to clean or recondition or otherwise surface-treat workpieces such as castings, weldments, or other rough surfaced articles. Such machines are also used for the purposes of descaling or deburring or otherwise surface-treating such articles; and the present invention relates more particularly to an improved machine for the above purposes which is adapted to accommodate with improved facility extremely long workpieces.

It is a primary object of the present invention to provide an improved blasting machine and workpiece loading and unloading housing arrangement, whereby substantial savings in the required overall factory floor space will be effected in connection with the handling of extremely long workpieces.

Another object is to provide an improved machine housing and workpiece handling arrangement as aforesaid whereby relatively large workpieces may be loaded into and processed by the machine and then unloaded, with greatly improved facility.

Still another object is to provide a machine arrangement as aforesaid which is structurally simple and foolproof in operation, and which is easily sealed against escape of blasting medium or dust etc. therefrom.

Other objects and advantages of the present invention will appear in the specification hereinafter, wherein:

Figs. 1a and 1b comprise a composite side elevational view of a blasting machine and workpiece housing arrangement of the present invention;

Figs. 2a and 2b comprise a composite top plan view of the machine of Figs. 1a—1b; and

Fig. 3 is a vertical section on enlarged scale taken along line III—III of Fig. 1b.

As shown in the drawing herewith, the invention is embodied in a machine comprising generally a stationary "blast" housing 10 comprising a top wall 12 and opposite side walls 14, 14; being thereby open at its opposite ends. At one of its open ends the housing 10 is provided with a laterally extending stationary tunnel-like housing or "vestibule" as indicated generally at 15, comprising top and sidewall portions in extension of the corresponding walls of the housing portion 10. The "vestibule" 15 is closed at its outer end as indicated at 16 and is provided therewith with a pair of air outlet manifolds 18 leading to conduits 19, 19, which in turn connect through suction ducts to some suitable dust collector device (not shown) for purposes to be explained hereinafter.

Parallel track rails as illustrated at 20, 20 supported upon cross ties or beams 22 run lengthwise through the housing portions 10, 15. The rails also extend from the housing 10 in the opposite direction substantially at floor level out into the adjacent factory space for a distance substantially equal to the length of the stationary vestibule portion 15. Thus, a workpiece carrying car as indicated at 25 mounted upon rollers 26 may be arranged to run upon the track rails 20, 20, and to shuttle back and forth from the loading position thereof at the

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left hand end of the machine as shown in Figs. 1a, 2a, through the blast housing 10, then into the stationary vestibule 15; and then in reverse direction to return for unloading again at the left end of the machine. Thus, relatively long workpieces, much longer than the engine crankcase casting illustrated at 28 herein, may be loaded upon the car 25 and moved thereby progressively through the blast housing 10 and thence into the housing 15; it being understood that the stationary vestibule 15 will in each instance of installation be lengthwise dimensioned so as to be adapted to accommodate the full length of workpieces expected to be processed by the machine.

One or more blast media throwing machines as indicated at 30 are mounted upon the "blast" housing structure 10 in any desired pattern of arrangement according to the nature of the workpieces to be processed; and are thereby disposed to project into the interior of the chamber 10 against the workpieces to be processed a corresponding number of streams of blasting media as illustrated at 32 (Fig. 3). Thus it will be appreciated that with the blasting machines 30 in operation the workpieces may be shuttled back and forth through the housing 10 any required number of times so as to be surface-processed by the blasting media throughout the entire lengths of the workpieces.

It is a particular feature of the present invention that the portion of the trackway which extends to the left of the housing 10 in the drawing herewith is arranged to be enclosed by a movable tunnel-like housing or "vestibule" as indicated generally at 35. The vestibule 35 is of a form similar to that of the stationary vestibule 15 but is of slightly lesser sectional dimensions whereby it is adapted to retract or telescope through the central housing 10 and into the interior of the stationary vestibule 15. This retractable vestibule 35 is carried by means of rollers 36 running upon parallel rails 38, 38. Thus, the retractable vestibule 35 is arranged to straddle the work carrying car 25 and to shuttle back and forth between its telescoped position interiorly of the vestibule 15 and its laterally extended position as illustrated in Figs. 1a, 2a.

A stationary end panel as illustrated at 40 is disposed to abut the end of the movable vestibule 35 when the latter is disposed outwardly at its fully extended position as shown in Figs. 1a, 2a. The end panel 40 includes an air inlet duct 42 opening as indicated at 44 into the atmosphere exteriorly of the machine, whereby when the machine is in operation the suction ducts 19, 19 at the opposite end of the machine will operate to create a draft of air through the inlet 44 and the ducts 42, through the interior of the vestibule 35 and the central housing 10 and the stationary housing 15, and thence through the manifolds 18, 18 into the conduits 19, 19 leading to appropriate dust collectors, or the like (not shown) as may be preferred.

Thus, it will be apparent that in order to load the workpiece, the movable vestibule 35 will initially be retracted into the stationary vestibule 15. The workpiece carrying cart 25 will then be placed in loading position as shown in Figs. 1a, 2a whereupon the workpiece may be mounted thereon by means of any suitable lifting and carrying equipment operating from either side thereof, or from overhead such as when an overhead crane is employed for loading and unloading purposes. The movable vestibule 35 is then shuttled back to its left hand end position as shown in Figs. 1a, 2a, whereby it will now complete the enclosure of the machine. The workpiece carrying car may then be trundled into and progressively through the blast chamber 10, so that the blasting machines mounted thereon will operate to surface-process the workpiece

from end to end as it moves slowly through the chamber and thence into the stationary vestibule 15. At the end of the passage the car may be run in reverse direction and the workpiece similarly treated on its return passage back through the blasting chamber 10 and thence into the movable vestibule portion 35. The cycle may of course be repeated any desired number of times.

Upon completion of the workpiece surface treatment, the workpiece car will be returned to the position thereof shown in Figs. 1a, 2a, and the blast machines 30 stopped, whereupon the movable vestibule 35 may again be trundled into the interior of the stationary vestibule 15, thus uncovering the workpiece and making it fully available for the workpiece unloading operation. Thus it will be seen that by virtue of this arrangement of the invention the overall floor space required for the machine is only slightly more than twice the length of the longest workpiece to be processed, whereas in accord with somewhat similar arrangements of the prior art, additional factory floor space of workpiece length is required in line with the loading vestibule.

Other prior art designs embodying double vestibule arrangements wherein one of the vestibules is provided with a vertically hinging or sliding door device of a length equal to the length of the longest workpieces to be accommodated are not practicable when working with long workpieces. Obviously, a vertically hinging door panel or the like would seriously interfere with the operation of loading and unloading large workpieces; whereas in the case of the present invention, when the movable vestibule is telescoped within the stationary vestibule the entire loading area of the machine is wide open from both sides and from above. Thus, maximum facility is provided for handling of the workpieces, as by means of overhead cranes, vertical lift or sidewise loading devices, and the like, as may be best suited to the operation. Furthermore, it will be apparent that the relatively movable housing parts of the machine of the present invention are of such nature as to be readily sealed against escape of flying blast media by use of simple flexible flap sealing devices or the like.

As shown in the drawing herewith it is another feature of the present invention that the blast media throwing machines 30 are preferably disposed (in plan view) in canted attitudes relative to the direction of movement of the workpieces back and forth through the machine. By virtue of this arrangement the blast streams are projected towards the workpieces in slightly oblique directions, as the workpieces shuttle back and forth under the line of fire of the machines. This arrangement provides good blasting results when handling workpieces of such shapes for example as include parts which would shield other parts of the workpieces from blast media if the projection directions were normal to the workpiece surfaces being treated.

The blast media circulation system of the machine is illustrated herein to include blast media collection hoppers 50 running lengthwise under the machine and delivering to a pair of tandem disposed reciprocating flight conveyors 52, 52 running under the trackways supporting the workpiece carrying cart 25. The reciprocating conveyors 52, 52 deliver the collected blast media to a crosswise disposed screw conveyor 54 which delivers the media to a vertical elevator 55 (Fig. 3). The elevator 55 in turn delivers to a conveyor 56 which discharges into a sizing separator 58. Oversize debris from the separator 58 is discharged to a suitable disposal point as through a conduit 59; and the fine debris or "spent" media is discharged to disposal as through a conduit 60. The reusable blast media issues from the bottom of the separator 58 through a conduit 62 to an elevator 64 which delivers into a cross conveyor 66 discharging into hoppers, 68, 69, from which the blast media flows by gravity through conduits 70 as required, to feed the blast machines 30.

To operate the movable vestibules 35 to shuttle between its machine closing and telescoped position, an endless power cable system may be employed. As illustrated in the drawing herewith, such system may comprise a power chain 75 driven by a cross shaft 76 which in turn is driven by means of a power unit 78. Similarly, the workpiece carrying table 25 may be powered by means of an endless power chain as indicated at 79, which is operated by a power unit indicated at 80. Motor drive devices for the conveyors, elevators and other powered elements of the machine are illustrated but are not described in detail herein, because it is believed clear that their functions will be apparent and well understood without further explanation. The controls for the motors driving the vestibule 35 and the car 25 may be either manual or semi-automatic and arranged to automatically run the workpiece car back and forth through the machine any predetermined number of times (as by means of suitable limit switch and cycling control devices, not shown) as may be preferred.

I claim:

1. A blasting apparatus including an open ended blast compartment having blast media throwing means disposed to project blast media into the interior thereof, a stationary vestibule arranged in open communication with one end of said compartment and extending therefrom for a distance substantially equal to the length of the longest workpiece to be accommodated, and a second movable vestibule of similar length longitudinally movable relative to said blast compartment and said stationary vestibule and so dimensioned as to telescopically move therewithin.

2. A blasting apparatus including an open ended blast compartment having blast media throwing means disposed to project blast media into the interior thereof, a stationary vestibule arranged in open communication with one end of said compartment and extending therefrom for a distance substantially equal to the length of the longest workpiece to be accommodated, a second movable vestibule of similar length longitudinally movable relative to said blast compartment and said stationary vestibule and so dimensioned as to telescopically move therewithin, and a stationary end panel positioned to abut and close the outer end of said movable vestibule when the latter is in its extended position with its inner end in telescopic sealing relation with said blast compartment.

3. A blasting apparatus including an open ended blast compartment having blast media throwing means disposed to project blast media into the interior thereof, a stationary vestibule arranged in open communication with one end of said compartment and extending therefrom for a distance substantially equal to the length of the longest workpiece to be accommodated, a second movable vestibule of similar length longitudinally movable relative to said blast compartment and said stationary vestibule and so dimensioned as to telescopically move therewithin, a stationary end panel positioned to abut and close the outer end of said movable vestibule when the latter is in its extended position with its inner end in telescopic sealing relation with said blast compartment, a trackway extending substantially throughout the length of said stationary vestibule and towards the position of said stationary end panel, said movable vestibule being movably supported upon said trackway, and power means for causing said movable vestibule to move back and forth on said trackway.

4. A blasting apparatus including an open ended blast compartment having blast media throwing means disposed to project blast media into the interior thereof, a stationary vestibule arranged in open communication with one end of said compartment and extending therefrom for a distance substantially equal to the length of the longest workpiece to be accommodated, a second movable vestibule of similar length longitudinally movable relative to said blast compartment and said stationary

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vestibule and so dimensioned as to telescopically move therewithin, a stationary end panel positioned to abut and close the outer end of said movable vestibule when the latter is in its extended position with its inner end in telescopic sealing relation with said blast compartment, a trackway extending substantially throughout the length of said stationary vestibule and towards the position of said stationary end panel, said movable vestibule being supported for movements back and forth upon said trackway, and a second trackway running interiorly of the rails of said first mentioned trackway and mounting a workpiece supporting car thereon.

5. A blasting apparatus including an open ended blast compartment having blast media throwing means disposed to project blast media into the interior thereof, a stationary vestibule arranged in open communication with one end of said compartment and extending therefrom for a distance substantially equal to the length of the longest workpiece to be accommodated, a second movable vestibule of similar length longitudinally movable relative to said blast compartment and said stationary vestibule and so dimensioned as to telescopically move therewithin, a stationary end panel positioned to abut and close the outer end of said movable vestibule when the latter is in its extended position with its inner end in telescopic sealing relation with said blast compartment, a trackway extending substantially throughout the length of said stationary vestibule and towards the position of said stationary end panel, said movable vestibule being movably supported upon said trackway, power means for causing said movable vestibule to move back and forth upon said trackway, a second trackway running interiorly of the rails of said first mentioned trackway and mounting a workpiece supporting car thereon, power means operable to cause said car to move back and forth upon said second trackway, and hopper means disposed beneath said trackways for collecting spent blast media.

6. A blasting apparatus including an open ended blast compartment having blast media throwing means disposed to project blast media into the interior thereof, a stationary vestibule arranged in open communication with one end of said compartment and extending therefrom for a distance substantially equal to the length of the longest workpiece to be accommodated, a second movable vestibule of similar length longitudinally movable relative to said blast compartment and said stationary vestibule and so dimensioned as to telescopically move therewithin, a stationary end panel positioned to abut and close the outer end of said movable vestibule when the latter is in its extended position with its inner end in telescopic sealing relation with said blast compartment, said stationary vestibule being closed at its outer end, an air suction duct arranged in communication with said stationary vestibule to withdraw air and dust from interiorly of said apparatus for disposal, a trackway extending substantially throughout the length of said stationary vestibule and towards the position of said stationary end panel, said movable vestibule being movably supported upon said trackway, power means for causing said movable vestibule to move back and forth upon said trackway, a second trackway running interiorly of the rails of said first mentioned trackway and mounting a workpiece supporting car thereon, power means operable to cause said car to shuttle back and forth upon said second trackway, hopper means disposed beneath said trackways for collecting spent blast media, conveyor means receiving the discharge from said hopper means and conveying same to a sizing separator, and means conveying from said separator reusable blast media to said blast media throwing means.

7. A blasting apparatus including an open ended blast compartment having blast media throwing means disposed to project blast media in oblique directions into the interior thereof, a stationary vestibule arranged in

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open communication with one end of said compartment and extending therefrom for a distance substantially equal to the length of the longest workpiece to be accommodated, and a second open ended vestibule of similar length longitudinally movable relative to said blast compartment and said stationary vestibule and so dimensioned as to telescopically move therewithin.

8. A blasting apparatus including an open ended blast compartment having blast media throwing means disposed to project blast media in oblique directions into the interior thereof, a stationary vestibule arranged in open communication with one end of said compartment and extending therefrom to a closed end portion disposed at a distance from the compartment substantially equal to the length of the longest workpiece to be accommodated, a second open ended vestibule of similar length longitudinally movable relative to said blast compartment and said stationary vestibule and so dimensioned as to telescopically move therewithin, and a stationary end panel positioned to abut and close the outer end of said movable vestibule when the latter is in its extended position with its inner end in telescopic sealing relation with said blast compartment.

9. A blasting apparatus including an open ended blast compartment having blast media throwing means disposed to project blast media in oblique directions into the interior thereof, a stationary vestibule closed at one end and arranged in open communication at its other end with one end of said compartment and extending therefrom for a distance substantially equal to the length of the longest workpiece to be accommodated, a second open ended vestibule of similar length longitudinally movable relative to said blast compartment and said stationary vestibule and so dimensioned as to telescopically move therewithin, a stationary end panel positioned to abut and close the outer end of said movable vestibule when the latter is in its extended position with its inner end in telescopic sealing relation with said blast compartment, a trackway extending substantially throughout the length of said stationary vestibule and towards the position of said stationary end panel, said movable vestibule being movably supported upon said trackway, and power means for causing said movable vestibule to move back and forth on said trackway.

10. A blasting apparatus including an open ended blast compartment having blast media throwing means disposed to project blast media into the interior thereof, a stationary vestibule closed at one end and arranged in open communication at its other end with one end of said compartment and extending therefrom for a distance substantially equal to the length of the longest workpiece to be accommodated, a second open ended vestibule of similar length longitudinally movable relative to said blast compartment and said stationary vestibule and so dimensioned as to telescopically move therewithin, a stationary end panel positioned to abut and close the outer end of said movable vestibule when the latter is in its extended position with its inner end in telescopic sealing relation with said blast compartment, a trackway extending substantially throughout the length of said stationary vestibule and towards the position of said stationary end panel, said movable vestibule being movably supported to shuttle back and forth upon said trackway, a workpiece carrying car movable back and forth within said vestibules and compartment, and controlled power means for motivating said movable vestibule and said car.

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