March 15, 1932. A. J. WALTERS 1,849,895

SAND BLAST APPARATUS

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Fig. 1

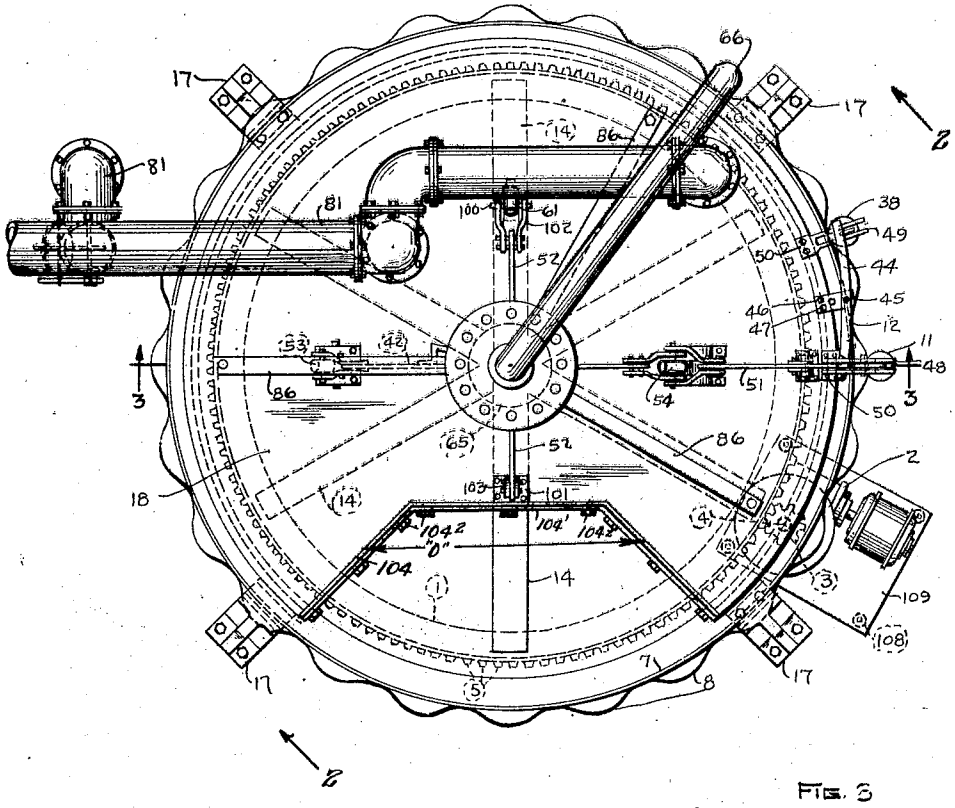


Fig. 3

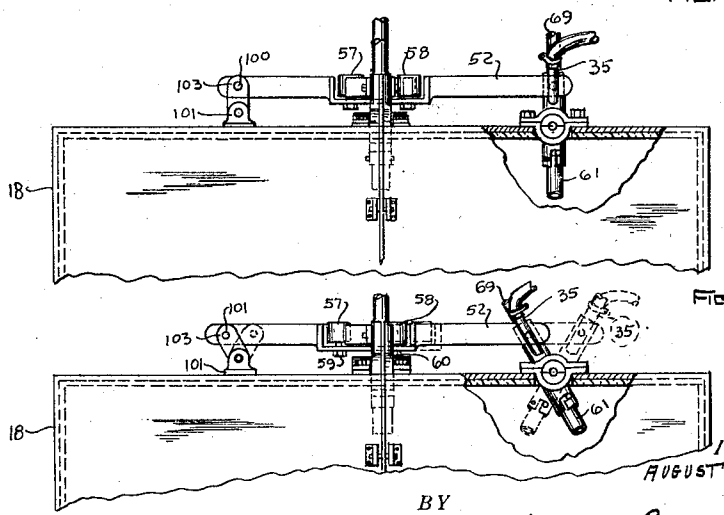


Fig. 7

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FIG. 2

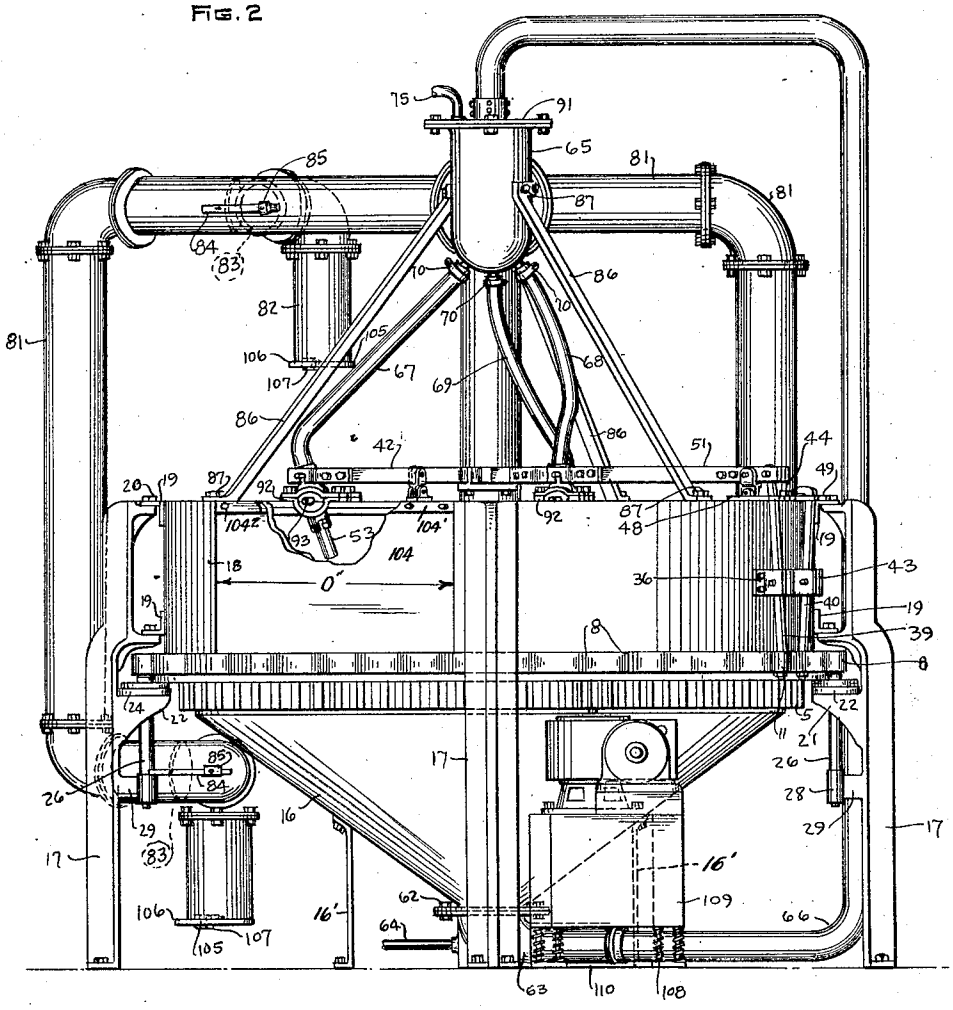


FIG. 13

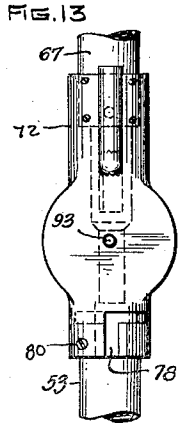


FIG. 13-A

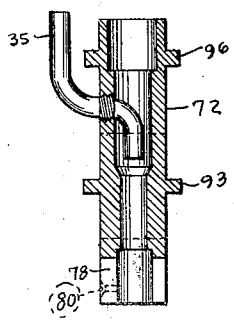
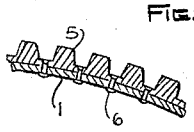


FIG. 14



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Fig. 3

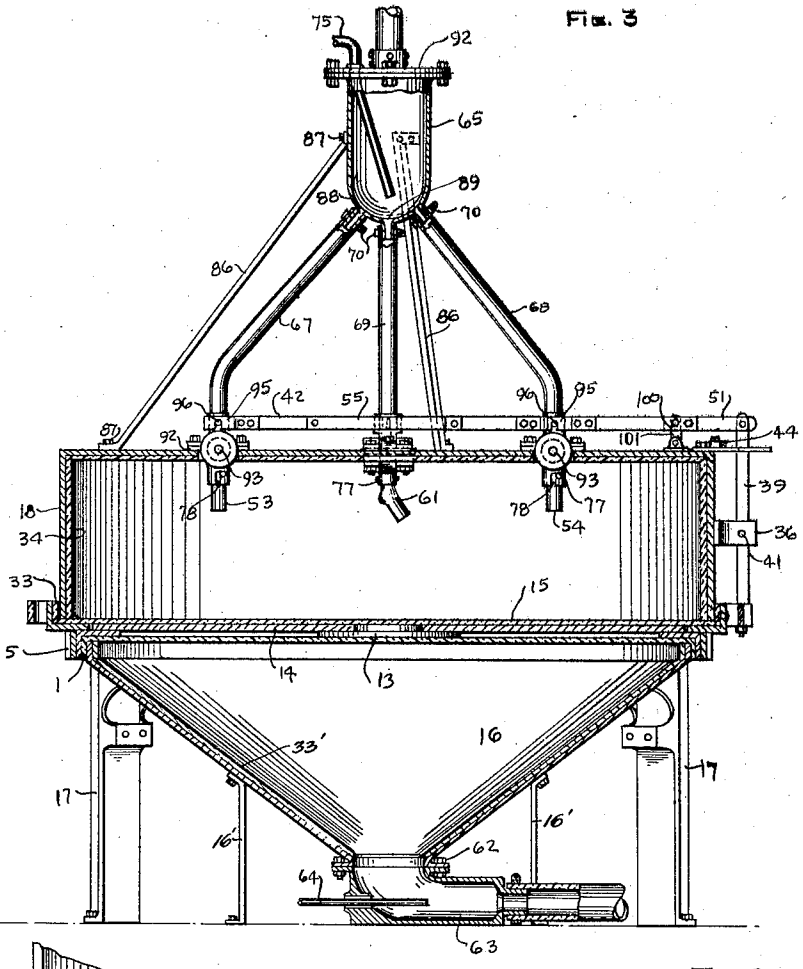
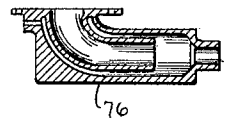


Fig. 10



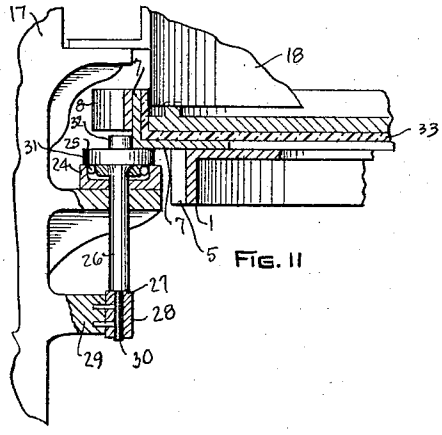


Fig. 11

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SAND BLAST APPARATUS

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Fig. 4

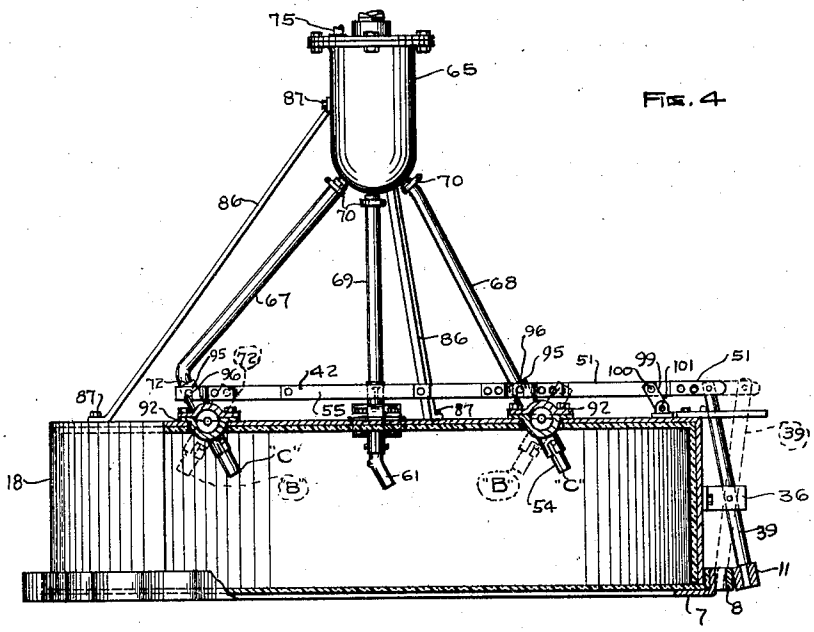


Fig. 5

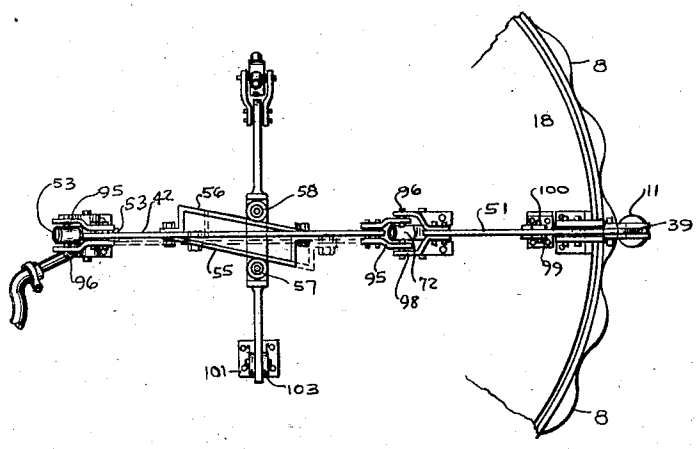


Fig. 12

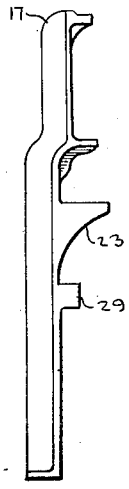
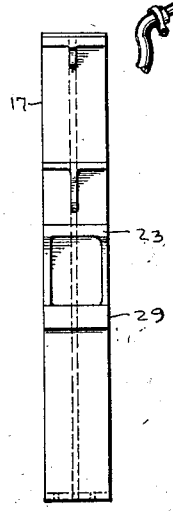


Fig. 12 A



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Fig. 8

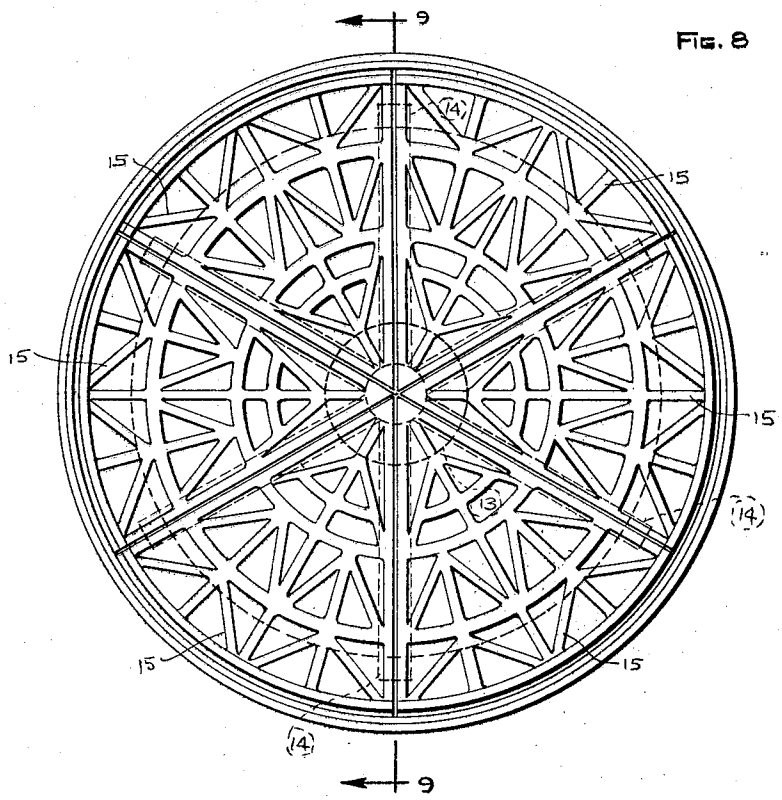
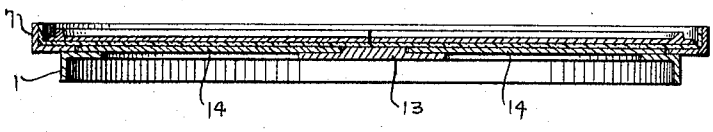


Fig. 9



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Patented Mar. 15, 1932 1,849,895

UNITED STATES PATENT OFFICE

AUGUST J. WALTERS, OF MAPLE HEIGHTS, OHIO

SAND BLAST APPARATUS

Application filed April 5, 1930. Serial No. 441,810.

This invention relates to sand blast apparatus particularly adapted and intended for applying sand blast to metal castings or the like.

One object of the invention is to provide such an apparatus with a casing in which the articles are held, said casing being mounted above a rotary workholding grating or table below which is a hopper for collecting the sand and a means for returning the same to the pressure line.

A further object of the invention is to provide improved means for delivering the sand blast to the articles, characterized especially by a plurality of swinging nozzles, by means of which, and in consequence of the rotation of the table, the blast is applied to the articles from various directions, so as to reach all parts of the same and effectively distribute the blast. A further object of the invention is to give the nozzles the correct time for passing over the ware in accordance with the rotary speed of the grating.

A further object of the invention is to provide improved means for operating the nozzles automatically with the rotation of the table.

A further object of the invention is to provide a construction in which no part of the gearing or driving mechanism is exposed to the sand, all the driving mechanism being located outside of the chamber in which the action on the articles takes place.

A further object of the invention is to provide a machine to which a portable electric motor and gear can be applied and placed anywhere around the machine for operating the same, thereby eliminating the trouble of providing a special plate in order to get connection with some power shaft. The present motor is so arranged that it can be plugged in to any convenient power socket.

A further object of the invention is to provide improved means for supporting the motor in such relation that there is no danger of stripping gear teeth or of anything getting between the gears.

A further object of the invention is to provide improved means for collecting coarse sand by the use of a sand baffle and sand leg, and which removes coarse sand drawn into the suction line.

A further object of the invention is to provide improved means for drawing away all dust from the blast casing.

A further object of the invention is to otherwise improve the supply and return connections to the sand chamber, and to provide a machine which can be set up on any floor and in which the use of special pits and settings is unnecessary.

Further objects and advantages will appear from the following description and the accompanying drawings in which:

Fig. 1 is a plan view of the apparatus.

Fig. 2 is side elevation thereof viewed on the angle indicated by the arrows 2—2 of Fig. 1.

Fig. 3 is a section on line 3—3 of Fig. 1.

Fig. 4 is a partial section on the same line showing the cam and the vertical nozzles in both extreme positions.

Fig. 5 is a detail top view showing the cam with the rubber roller for operating the nozzles.

Figs. 6 and 7 are details showing one of the nozzles in different positions.

Fig. 8 is a plan view of the grates.

Fig. 9 is a section on the line 9—9 of Fig. 8.

Fig. 10 is a section of the vacuum sand trap.

Fig. 11 is a fragmentary enlarged section of parts shown in Fig. 2.

Figs. 12 and 12*a* are side and elevational views of a supporting leg.

Figs. 13 and 13*a* are a front view and a section of the nozzle holder.

Fig. 14 is a fragmentary section of the driving gear.

Referring to the drawings:

A flanged iron ring table 1 is rotated by a portable vertical reduction and power unit 2 by means of a pinion gear 3 on a shaft 4 meshing with a ring gear 5 attached to the ring table 1 by screws 6. To the table 1 is fastened, by suitable means, such as welding, an upper angle iron ring 7 which has a series of cams 8 attached or formed thereon and adapted to move the levers 39 and 40 forward and back as the rollers 11 and 38 travel over the

cams 8. Attached to angle iron ring 1 is a center supporting plate 13 upon which rests one end of the cross arms 14, the other end resting on the top of the angle iron ring 1 and being attached to both by suitable means such as welding; the cross arms 14 in turn support the grates 15 upon which the castings are placed for sanding, the grates being constructed in such manner as to permit the sand to fall through into the hopper 16 the upper end of which fits closely under the ring 1.

Supporting legs 17 are attached to a circular casing 18 by means of angle iron brackets 19 and bolts 20, and the lugs 23 of the supporting leg 17 have attached thereto by means of bolts, retaining blocks 24 holding radial thrust bearings 25 in place while the shafts 26 revolve within the bearings 25. Said shafts 26 extend downward until the shoulders 27 rest upon the split blocks 28 which hold the smaller end portion 30 of the shafts 26 as bearings and thus support the shafts 26 and carrying the loaded angle iron ring table 1 and supporting the outward thrust on the ring table 1. Each of the said split block bearings 28 is fastened to a lug 29 on the supporting leg 17, allowing the smaller base portion of the shaft 26 to revolve freely, the upper portion of the shaft 26 being enlarged as at 31 to carry the vertical load and the upper extended portion 32 sustaining the side thrust on the ring table 1. Fastened within the upper ring 7 is a rubber lining 33 within which the stationary casing 18 fits, a rubber lining 34 being fastened also within the casing 18, the top of the said casing 18 supporting the blasting nozzles 53, 54 and 61 which will be described in detail later.

The rubber rollers 11 and 38 turning on the bottom of the vertical levers 39 and 40 are used for moving said levers 39 and 40 back and forth as each lever roller engages the cams 8 on the angle iron ring 7, in turn, one lever 39 being on the concave surface as the other lever 40 is on the convex surface of the cams. The vertical lever 39 pivots at 41 and extending upward its upper end is connected to a reciprocating rod 42. Brackets 36 and 43 are fastened to the casing 18 preferably by a weld, and hold the levers 39 and 40 in position, by means of pivot pins 41 which allow the said levers to rock back and forth. A horizontal curved lever 44 is pivoted on pin 45 to a bracket 46 which is fastened to the casing 18 by bolts 47, and guides 48 and 49, secured to the casing 18 by bolts 50, guide the movement of the levers 39 and 40.

These levers 39 act to reciprocate a link or rod connection to the swinging nozzles 53, 54 and 61 as follows: The rod 51 is connected to the upper end of the lever 39 and is guided in its movement by a swinging link 99 pivoted thereto at 100 and to a bracket 101 on top of the casing 18. The inner end of the rod 51 is forked as indicated at 98 and connected by pivot pins 96 to the projecting part of a nozzle 54, and said pins 96 also connect the rod 51 to a yoke 95 at the end of a reciprocating rod 42 the outer end of which is connected by a similar fork 95 and pins 96 to a swinging nozzle 53. The rod 42 has wedge cams 55 and 56 attached to opposite sides thereof and bearing against rollers 57 and 58 carried by a transversely reciprocating rod 52 one end of which is guided by pivoted links 103 attached to a bracket 101 on top of the casing and the other end of which is connected by a yoke 102 to pins 100 on a laterally swinging angular nozzle 61. The lever 40 bears at its upper end against one end of the horizontal lever 44 the other end of which bears against the inner side of the lever 39. In the operation of these parts the levers 39 and 40 act oppositely. As the roller 11 on the lever 39 passes a rise of the cam 8 it swings the upper end of the lever inwardly and by means of the connections shown the nozzles are swung to the positions C in Fig. 4. At that time the roller at the lower end of the lever 40 is in one of the depressions of the cam, and vice versa. When the roller at the lower end of the lever 40 passes a high point of the cam the upper end of the lever swings the lever 44 and reverses the movement, returning the connecting rods and swinging the nozzles to the dotted line position B in Fig. 4. At the same time the nozzle 61 is swung back and forth by the operation of the cams 55 and 56.

Sand is supplied to the nozzles 53, 54 and 61 from the sand hopper 16 through a trap 63 which is fastened by bolts 62 to the outlet from the hopper. The air line 64 extends into the trap, and when the pressure is turned on the sand is blown through the connecting pipes 66 into a sand or agitating chamber 65 located above the casing. The air pressure may be controlled by any suitable globe valve or service cock located on the air line at any convenient place to be manipulated by the operator at will. Sand tubes 67, 68 and 69 are attached to chamber 65 by hose clamps 70 and to the nozzle holders 72 (Fig. 13). An auxiliary air line 75 leads into the chamber 65 and is provided to agitate the sand and drive it downward through tubes 67, 68 and 69 to keep blasting nozzles 53, 54 and 61 supplied with the correct amount of sand needed to clean the castings properly and is controlled by a common valve or service cock on the auxiliary air line 75. A vacuum sand trap 76 (Fig. 10) may replace the pressure sand trap 63 when light sand blasting is required and only a low pressure of air and small amount of sand are necessary.

The nozzles 53, 54 and 61 are equipped with lugs 77 which engage in bayonet slots 78 in the nozzle holders 72, and are then locked

in position by screws 80 and so designed for rapid changing.

Suction line 81 is designed and placed on the machine and tapped into the top of the casing, to give best results in removing dust from the machine and safeguarding the operator, and sand legs 82 on the suction line 81 are to catch and hold the coarse sand drawn into the suction line 81, and sand baffles 83 being placed therein to prevent the coarse sand from entering the casing. These sand baffles 83 are equipped with a balance lever 84 and counterweight 85 set to close suction line 81 when the fans are not operating, by assuming a vertical position thereby stopping the back pressure sometimes caused by air in the suction line 81.

Supports for the chamber 65 are shown at 86 and are fastened to the chamber and the casing 18 by bolts 87. Said chamber 65 has three outlets 88, 89 and 90 to which the sand tubes 67, 68 and 69 are attached as previously described, and has a removable cap 91, the two being bolted together with a rubber gasket between.

The vertical nozzles 53 and 54 are used for downward blasting, while the inclined 30 degree nozzle 61 is used for side and top slant blasting. To permit movement of the nozzles, a split block bearing 92 is bolted to the top of the casing 18 which is cut out to allow the nozzle holders 72, to protrude through, the said nozzle holders swinging on lugs 93 held in the bearings 92, as the reciprocating rods 42, 51 and 52 move backward and forward.

The casing 18 is open at the front of the machine as shown at O to remove and replace work and the operator is protected from flying particles of sand by a rubber apron or curtain 104 attached to the casing by means of plates 104′ and bolts 104^2.

The hinged covers 105 at the bottom of the sand legs 82 are held closed by means of a lever 106 and counterweight 107.

A set of four powerful compression springs 108 are located between the power unit base 109 and the steel floor plate 110 for the purpose of aligning the pinion gear 3 with the angle iron ring gear 5 and keeping them in mesh in case of any irregularity in diameter of the angle iron ring 1. Obviously the power unit can be placed at any desired location around the ring gear.

The high pressure air line 35 into nozzle holder 72, is used for heavy and hard casting cleaning and controlled by a valve in the same manner as the other air lines. Nozzle holder 72 is designed to give a straightaway course for the sand to flow through nozzles 53, 54 and 61 thus eliminating undesirable resistance to the high pressure line 35.

In operation, the castings or other articles to be sanded are placed within the rubber lined casing 18 through an opening O shown in Figs. 1 and 2 provided for that purpose, and they rest on the gratings 15. The grating or table is then rotated by means of the power plant and gear, the joint between the casing and grating being sealed by the rubber gasket 33. The various nozzles are caused to oscillate or swing by the travel of the levers 39 and 40 over the cam ring 8, the motion being communicated to the nozzles by the linkage above described. These nozzles deliver the sand in various changing directions as the table rotates, and all parts of the castings are reached. The sand drops through the grating into the hopper 16 from which it is again returned by air pressure and the pipe line 66 to the agitating tank or chamber 65 where it is agitated and blown out through the pipes 67, 68 and 69 to the various nozzles, so it may be used over and over again. Dust is collected by the suction line 81 with its traps or sand legs to collect coarse material. The motor and gear mounted on the stand 109 can be located in any suitable position around the ring gear 5. The table or grating which carries the castings is entirely supported by the bearing shafts 26 and the legs 17. The inner surface of the drum 18 is protected by the rubber coating 34, and all the parts of the sanding passages and chambers are practically dust tight so that the apparatus will be clean and healthy, and relatively high pressure can be used if desired.

I claim:

1. A sand blast apparatus comprising a rotary grating on which the work is supported, a fixed casing over the grating to enclose the work, a hopper under the grating, to receive the sand which falls through the latter, and means to rotate the grating including a ring gear at the periphery thereof and a pinion engaging said ring and movable to various places around the ring gear.

2. A sand blast apparatus as in claim 1, and a motor for operating the pinion, said motor and pinion being mounted on a portable stand adapted to be located at various places around the ring gear.

3. A sand blast apparatus as in claim 1, and an electric motor to drive the pinion, said motor and pinion being mounted on a support separate from that of the casing and movable to various places around the gear.

4. In a sand blast apparatus, the combination of supporting legs, bearings mounted thereon, a ring provided with a grating, rotatably supported by said bearings, a casing fixed to the legs over the grating, a hopper supported by the legs under the grating, and means engaging said ring to rotate the grating, said bearings having a supporting part upon which the ring rests and a thrust pin against which the side of the ring rests.

5. A sand blast apparatus comprising a rotary grating on which the work is support-

ed, a casing over the grating to enclose the work, a movable sand blast nozzle mounted in the top of the casing, and means to move the nozzle to point the same in various directions as the grating is rotated, said means including a cam ring at the periphery of the grating.

6. A sand blast apparatus comprising a rotary grating on which the work is supported, a casing over the grating to enclose the work, a movable sand blast nozzle mounted in the top of the casing, and means to move the nozzle to point the same in various directions as the grating is rotated, said means including a cam ring at the periphery of the grating, and a lever actuated by the cam and operatively connected to the nozzle.

7. A sand blast apparatus comprising rotary grating on which the work is supported, a casing over the grating to enclose the work, a hopper under the grating, a movable sand blast nozzle mounted in the top of the casing, means to return sand from the hopper to the nozzle, and means to move the nozzle to point the same in various directions as the grating is rotated, the edge of the grating working at a close fit between the lower edge of the casing and the upper edge of the hopper.

In testimony whereof, I do affix my signature.

AUGUST J. WALTERS.