June 27, 1944. W. A. ROSENBERGER ET AL 2,352,588

DIRECTIONAL CONTROL CENTRIFUGAL BLASTING MACHINE

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Fig. 1.

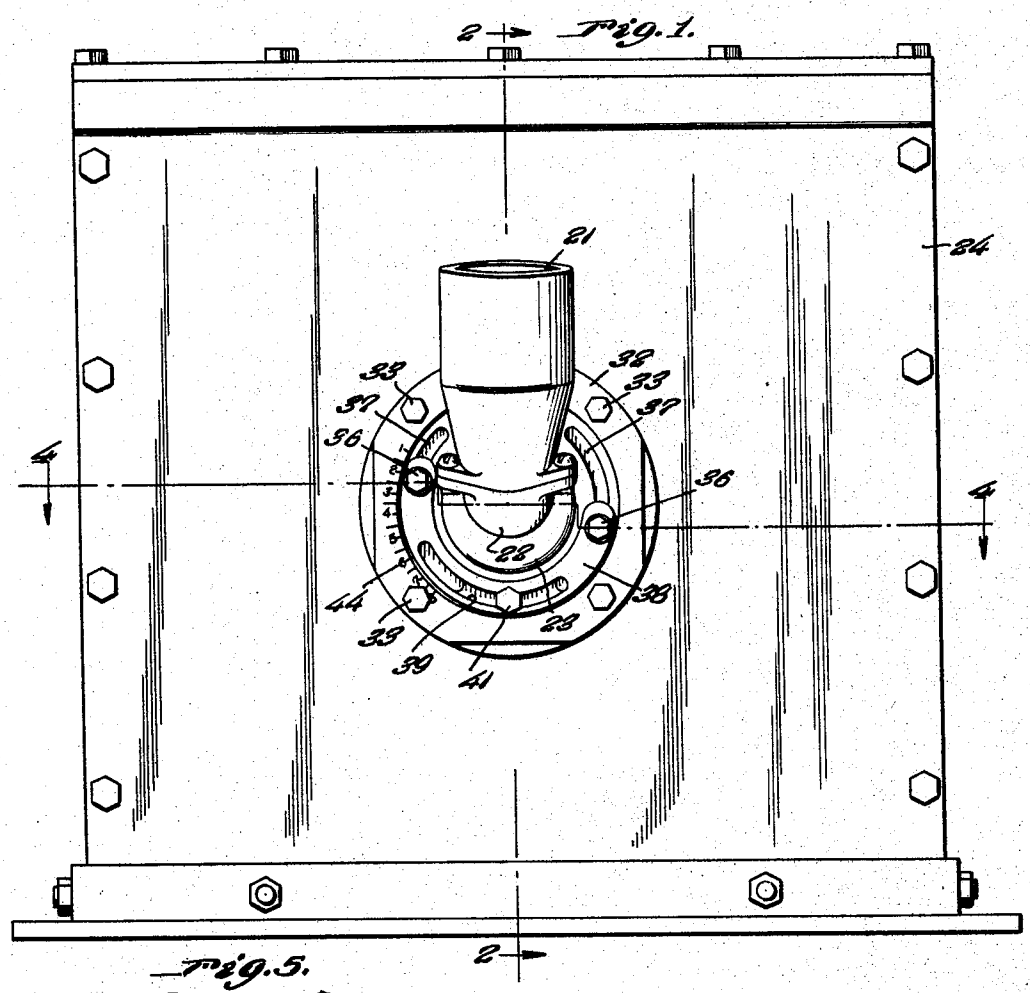


Fig. 5.

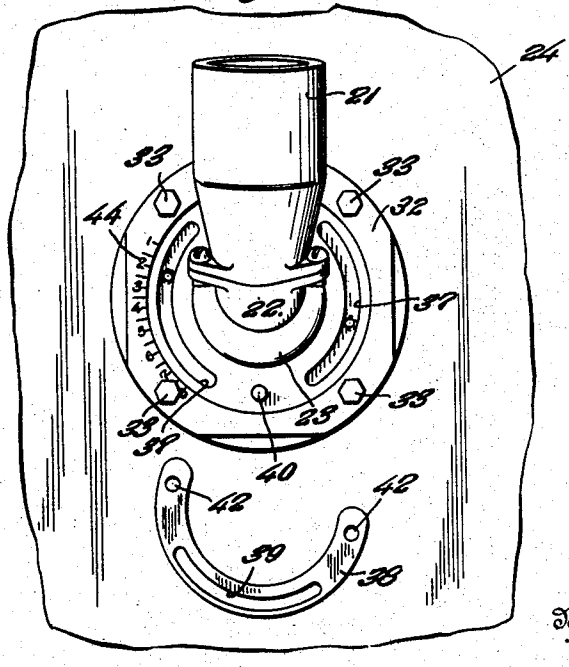


Fig. 7.

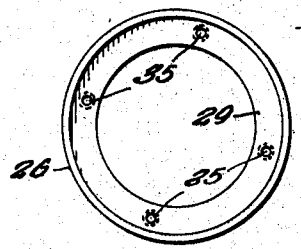


Fig. 8.



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Fig. 2.

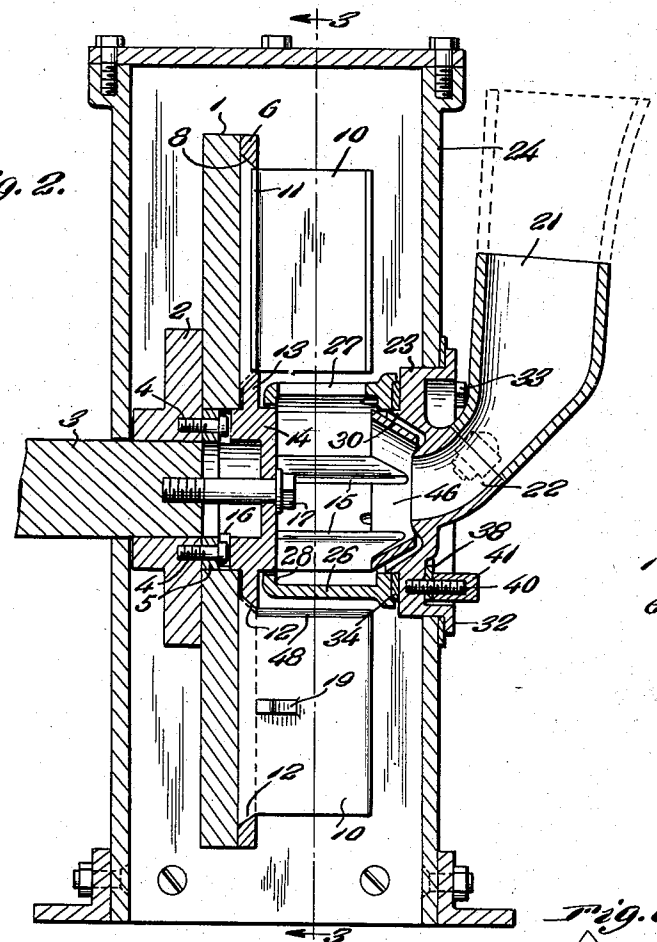
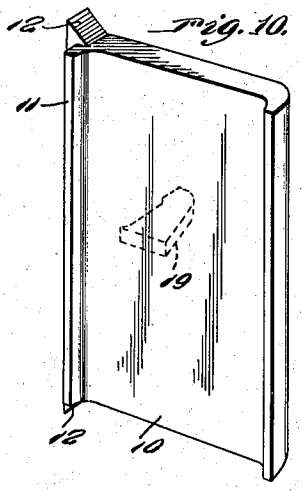


Fig. 10.



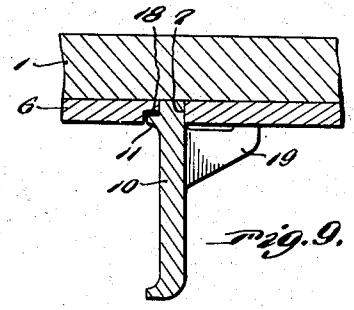
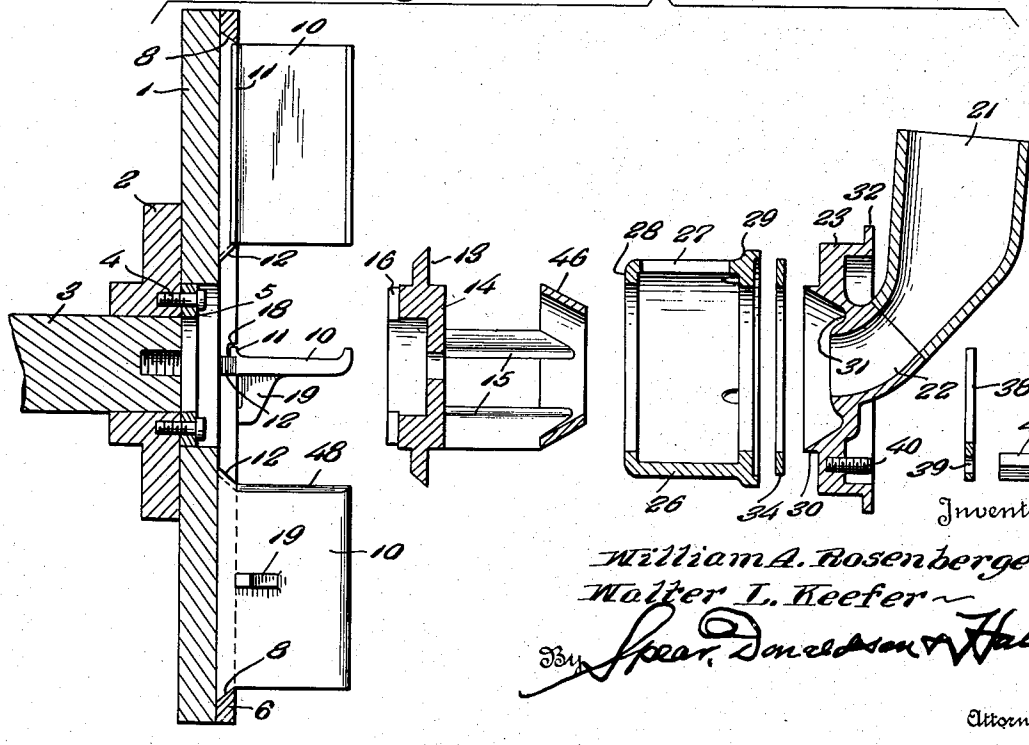


Fig. 9.

Fig. 6.



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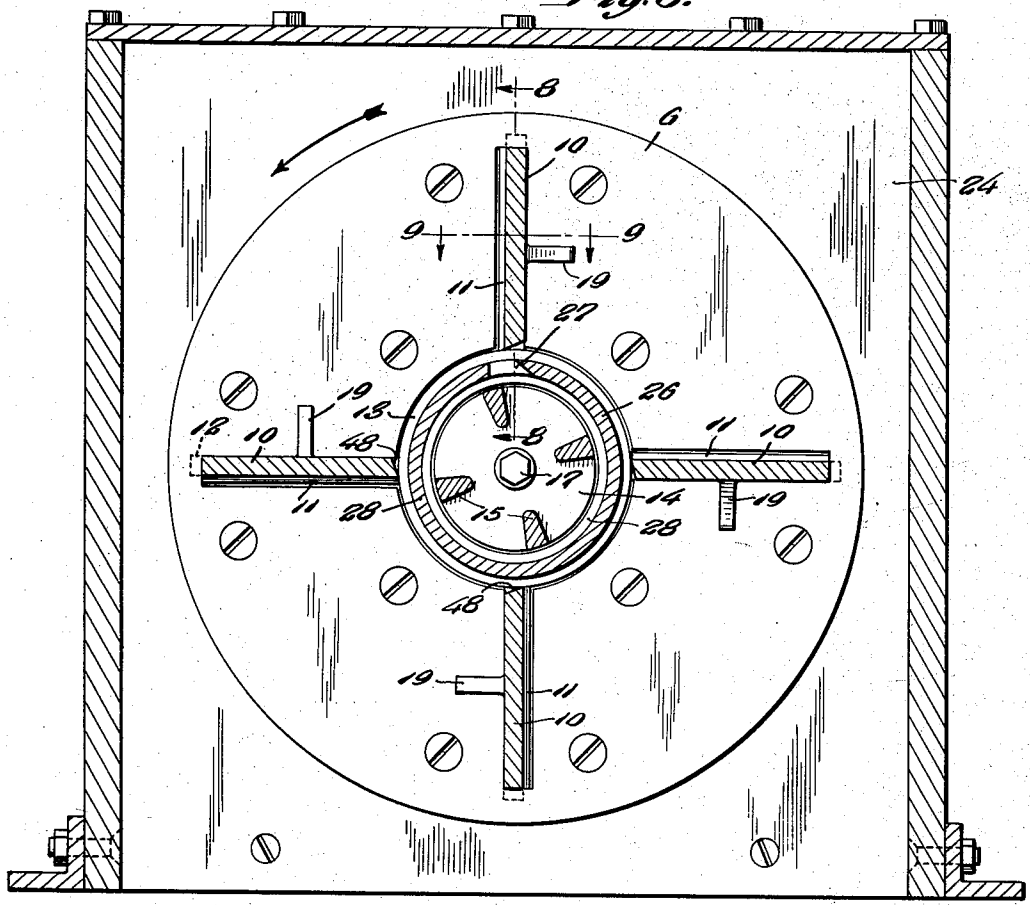
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DIRECTIONAL CONTROL CENTRIFUGAL BLASTING MACHINE

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Fig. 3.



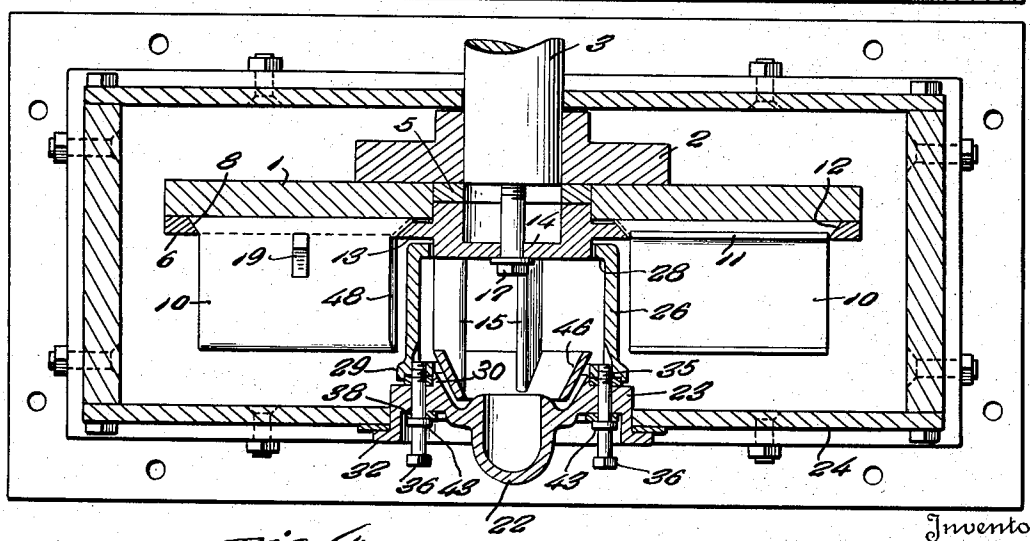


Fig. 4.

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Patented June 27, 1944 2,352,588

UNITED STATES PATENT OFFICE

2,352,588

DIRECTIONAL CONTROL CENTRIFUGAL BLASTING MACHINE

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Application March 7, 1941, Serial No. 382,256

10 Claims. (Cl. 51—9)

This invention relates to a directional control centrifugal blasting machine for propelling at high velocity and in a desired direction a stream of abrasive such as steel shot, or metallic grit, against a casting or other object for the removal of surface material therefrom.

The machine of our invention includes a rotor driven at high speed—upward of 2000 R. P. M.—comprising a head and a plurality of substantially radially arranged propeller blades, an abrasive supply having a discharge port located coaxial of the rotor, and a transfer mechanism between the rotor and the supply for receiving in an unobstructed axial passage the abrasive delivered from said port and propelling it outward in a stream transversely across the orbit of the inner edges of the propeller blades at a selected clock-dial position.

The propeller blades function independently of one another and the inner edges thereof during their passage through only a short selected arc successively cut off the outer portion of the abrasive stream, which is of substantially the full width of the blade, and the severed slug of abrasive is picked up and carried forward by the blade which cuts it off from the stream. Due to the centrifugal force developed in the angular movement of the blade the abrasive is caused to travel lengthwise thereof and glides from its outer edge at a velocity and in a direction which is the resultant of the velocity acquired thereby in its movement with the blade and the velocity due to centrifugal force.

Each blade is thin in the direction of its travel, or in a direction perpendicular to its carrying face, to avoid the presentation of more than an inconsequential obstruction to the outward travel of the abrasive stream from the transfer mechanism and for avoiding the presentation of an arresting surface against which the abrasive might lodge and act with destructive effect upon the control member of the transfer mechanism and the blades are so supported as to leave wide unobstructed spaces therebetween for the free and unobstructed outward travel of said stream.

The front, or abrasive carrying, face of the blade is made without abrupt change in direction from its inner to its outer edge and this area is also made highly resistant to abrasion, and in consequence there is no material abrupt change in the direction of travel of the abrasive from the point where it is picked up by the blade to the point where it glides off of the outer edge thereof. The blades are of sufficient length to effect the discharge of abrasive streams toward the work at an abrading velocity, in the rotation of the rotor at optimum speed, and the inner edge portions thereof are located sufficiently close to the axis of rotation to avoid high, or destructive, initial impact of the blades with the abrasive.

The abrasive is discharged from the outer edges of the rotor blades only during their passage through a relatively short arc, the position of which is related to and determined by the position of the short arc traversed by the inner edges of the blades during which only they pick up the abrasive, and thus the abrasive stream discharged at high velocity from the rotor, or the streams discharged from the outer edges of the rotor blades, may be directed to play only upon work located below the axis of the machine, or only upon work located above the axis of the machine, or only upon work located at intermediate points.

Among the salient objects of the invention are to provide a machine of the character recited which is particularly simple and strong in construction; in which replacements may be readily made of the parts which are subjected to rapid wear; in which the face of each rotor blade is from the outer to the inner edge of the blade without abrupt change in direction and is highly resistant to abrasion; in which the travel of the abrasive outwardly from the transfer mechanism is not materially arrested, or a material area presented for lodgment of abrasive by the rotor blades or carriers therefor; in which a guard about the periphery of the rotor is not required for determining the clock-dial position of the discharge of the stream of abrasive from the rotor, or rotor blades; in which the acceleration of the abrasive by the rotor blade is not retarded; in which the rotor blade in length greatly exceeds the radius of the outer member of the transfer mechanism and the inner ends of said blade terminate in close juxtaposition to said outer member, and in which the inner member of the transfer mechanism includes a plurality of radial vanes or blades having inner thin edges spaced from one another to define an axial passageway registering with the discharge port of the abrasive supply and permitting the unobstructed flow of the abrasive into and lengthwise of said passage.

A preferred construction of machine exhibiting our invention is illustrated in the accompanying drawings wherein:

Figure 1 is a front elevation of the machine; Fig. 2 is a vertical sectional view taken on the

line 2—2 of Fig. 1, looking in the direction of the arrows at the ends of said line;

Fig. 3 is a sectional view taken on the line 3—3, Fig. 2, looking in the direction of the arrows at the ends of the line;

Fig. 4 is a sectional view taken on the line 4—4, Fig. 1, looking in the direction of the arrows at the ends of the line;

Fig. 5 is a partial front elevation of Fig. 1, at the feed spout, showing the arcuate retaining plate displaced below its proper position;

Fig. 6 is an exploded view of the wheel and spout;

Fig. 7 is a front elevation of the control shell;

Fig. 8 is a section on the line 8—8 of Fig. 3 of the inner disc only of the runner head;

Fig. 9 is a detailed sectional view taken on the line 9—9, Fig. 3, looking in the direction of the arrows at the ends of said line;

Fig. 10 is a perspective view of one of the propeller blades.

In general, the machine comprises (*a*) a rotor, (*b*) an abrasive supply spout, and (*c*) a transfer mechanism located coaxial of the rotor which picks up the abrasive discharged from the spout and directs it in a stream travelling forwardly and outwardly across the orbital path of the inner end edge of each propelling blade of the rotor, and at an acute angle to its face when the blade initially contacts the stream.

As shown herein, the rotor comprises a head and four widely spaced apart substantially radially disposed propelling blades. The blades act independently of one another in severing the outer portion of the abrasive stream propelled by the transfer mechanism, and in accelerating it and in discharging it toward the workpiece.

The rotor head includes an outer circular disk 1, fixedly secured to a hub 2 splined, or otherwise rigidly attached, to a horizontal shaft 3 driven at high speed—of the order of 2250 revolutions per minute—by suitable means, as an electric motor. Attached to the hub 2 by screws 4 is a flat ring 5 which is coaxial thereof and snugly fits within an axial opening in the disk 1.

Fixedly attached to the inner face of the disk 1, as by suitable screws, is an inner disk 6 of practically the same diameter as the disk 1, and having a like, but somewhat larger, axial opening than that in the disk 1. The second disk is provided with a plurality of radial slots 7, equal in number to the number of propeller blades 10 to be hereinafter described, which open at their inner end through the axial opening therein, and are closed at their outer end adjacent the periphery of the disk by an undercut wall 8.

Each blade extends inwardly from a point contiguous the periphery of disk 6 to a point contiguous the periphery of the cylinder wall of the shell 26 of the transfer mechanism later to be described. The front face of each propelling blade is substantially oblong in shape and is without abrupt change in direction from end to end and is initially substantially smooth. The abrasive is picked up by the inner end portion of the blade with a low order of impact, and the blade continuously accelerates the abrasive without abrupt changes in the general direction of its movement, until it glides from the outer edge of the blade in a stream which is uninterrupted until it strikes the work. Each propelling blade is of sufficient length to insure that the abrasive gliding off of its outer edge, or discharged from the periphery of the rotor, is at a sufficiently high velocity to effect the desired abrading or attrition action, provided the head is rotated at an appropriate speed of the order stated for a rotor of about nineteen inches in diameter.

Each propelling blade 10 is provided with a raised rib 11 along its inner lengthwise edge, the inner wall of which is so curved as to merge into the adjacent part of the flat front face of the blade. The propelling blades are made of Ni-hard, or some other similar alloy, having a high degree of resistance to the severe friction action of the abrasive travelling lengthwise of the same due to centrifugal force, or such face may be provided with an impact plate of resistant material, or the face may be suitably treated to make it resistant. Propelling blades made of Ni-hard or similar alloy are satisfactory in commercial operations. Each propelling blade is provided at the opposite ends of its inner lengthwise edge with extensions 12 having reversely beveled surfaces. That at the outer end of the blade is complemental to the undercut wall 8 and that at the inner end of the blade is complemental to the bevel end of a flange 13 arranged peripherally of a cup shaped member 14 of an impeller element having blades 15 to be described. The cup 14 has its open end portion fitting snugly within the axial opening of disk 1. Notches 16 in the end face of the cup-shaped member 14 receive the heads of screws 4 to provide a driving connection between the cup and shaft 3. A bolt 17 extending through the bottom of the cup with its shank in threaded engagement with a tapped hole in shaft 3, and having its head bearing on the exterior of said bottom forces the flange 13 into clamping contact with the extension 12 at the inner end of the propelling blades for retaining the blades rigidly in the rotor head and for interlocking notches 16 with the heads of screws 4. The bottom of the cup 14 must not be so long as to contact the ring 5 as it would prevent locking engagement of flange 13 against the inner extensions 12 of the blades.

The rib 11 at the inner lengthwise edge of each blade, is spaced a short distance from the extreme edge of the latter, and preferably interfits in a rabbet 15 along one edge of the slot 7 in disk 6, which receives the blade. An arm 19 extending from the rear face of each blade midway of its length has an end contacting the exposed face of the disk 6 to act as a brace for the blade.

The abrasive supply spout includes an upper section 21 and a lower section 22. The lower section 22 is rigid with a supporting plate 23 bolted to the adjacent side wall 24 of a suitable casing which does not function as an abrasive assisting device or device from which a large quantity discharged from the rotor reacts for return to the orbit of the propeller blades as in the prior art. The discharge end of spout section 22 registers with one end of an unobstructed axial passage in the impeller which is defined by the inner edges of the impeller blades 15, and its opposite end is coupled to the spout section 21 which may depend from a suitable abrasive container or the upper end of which may be belled out as indicated in dotted lines to receive the abrasive from a suitable source.

The gravity head of the abrasive supply is sufficient for insuring that the desired quantity of abrasive will flow into the entrance end of the unobstructed axial opening, or passage in the impeller and pass lengthwise thereof to be picked up by the inner marginal edges of the blades

15 throughout substantially the entire length thereof.

The transfer mechanism comprises the impeller having blades 15 and a hollow cylindrical shell 26 telescoping thereon, or enclosing the same, and which serves to direct the path of travel of the abrasive which is mechanically projected outwardly by the impeller across the orbital path of the inner ends of the propeller blades 10.

Through the cylindrical wall of the shell 26 is an oblong opening 27 somewhat less in length than the width of the propeller blade and so located that a vertical plane transverse to the axis of the rotor will substantially intersect the middle of the longer axis of the opening 27 and the middle of the shorter axis of the face of the propeller blade. One end wall 28 of the shell 26 has a central opening which receives the closed end portion of the cup 14, and the opposite end wall 29 of the shell is provided with an opening which receives a boss 30 snugly fitting therein and which projects from the inner wall of the plate 23. The plate 23 is dished at 31 and is provided at its open end with an outwardly extending flange 32 provided with openings to receive the shanks of bolts 33 which fixedly secure the plate 23 to the adjacent side wall 24 of the casing enclosing the blasting unit.

The end wall 29 of the shell is provided with tapped holes 35 for receiving the threaded ends of the shanks of bolts 36 which are provided for adjustably securing the shell 26 to the plate 23. A shim or washer 34 lies between shell 26 and plate 23. There are preferably four holes 35 equidistantly spaced from one another in the wall 29.

For permitting of the ready circumferential adjustment of the shell 26, the bottom or end wall of plate 23 is provided with arcuate slots 37 through which extend the shanks of the bolts 36. If it is not desired to readily shift the position of the opening 27 after the machine has been assembled, the arcuate slots 37 and the parts now to be described, which coact with bolts 36, may be dispensed with. In that event, diametrically opposite openings would be provided through the wall of the plate 23 which would register with the tapped holes 35, and through which the shanks of the two retaining bolts 36 could be passed. The heads of the bolts, or shoulders, corresponding to the under faces of the heads would be drawn into clamping contact with the outer face of the plate 23 when the bolts are screwed home, for rigidly supporting the shell from the plate.

As illustrated in the accompanying drawings, however, instead of such circular openings in the plate 23, it is provided with the diametrically opposite arcuate slots 37 which permit the shell to be moved circumferentially when the bolts 36 are loosened and to be thereafter secured in a new position by screwing the bolts home. The shim 34 serves as a closure for the slots 37 to prevent the escape of abrasive through these slots.

For maintaining a setting of the shell which has been determined upon in respect to plate 23, notwithstanding the parts may be disassembled for the replacement of an impeller, or otherwise, there is provided an arcuate plate 38, resting against the front face of the bottom wall of the plate 23, having an arcuate slot 39 through which passes the shank of a bolt 40 which engages a tapped opening in the wall of plate 23. The nut 41 threaded on this bolt clamps against the outer face of the plate 38 for preventing its accidental movement after it has been set in a desired position. The ends of the plate 38 coact with the bolts 36 for maintaining the plate in a fixed position between the bolts. For the latter purpose, circular openings 42 are provided through the plate 38 adjacent each end thereof for receiving the shanks of the bolts 36.

As shown herein, each of the two bolts 36 is provided with a shoulder 43 spaced apart from the hexagonal head of the bolt for clamping against the outer face of the arcuate plate 38, and thereby firmly and fixedly holding the shell 26 on the plate 23. By loosening the bolts 36 and nut 41, the shell 26 can be circumferentially shifted. By tightening the nut 41, the arcuate plate 38 will be retained against accidental movement, and the bolts 36 will necessarily occupy the same positions, when replaced after the shell has been removed from plate 23 and replaced or a new one substituted for it as before, and this will insure that the opening 27 will occupy the same angular or circumferential position after the parts are re-assembled as it did before they were disassembled. For indicating the position of the opening, a suitable scale 44 may be placed on the exterior face of the flange 32 with which one of the bolts 36 will index.

The impeller includes in addition to the cup 14 a conical ring 46 coaxial of the cup and spaced a distance apart therefrom approximately the length of the opening 27, and a plurality of impeller blades 15 which bridge the space between the bottom wall of the cup 14 and the contiguous wall of the ring 46. The impeller blades or vanes 15 are spaced widely apart from one another circumferentially and their inner edges are thin and are also spaced apart from one another to provide an unobstructed axial opening or passage. As shown, these blades are of slight width, being considerably less in width than one-half the length of the propeller blades. The cup 14, ring 46, and blades 15 are integral with one another and are preferably formed of a single casting. The front, or propelling face, of each impeller blade is straight and initially smooth, but in use striations, or ripples, may be formed therein by the action of the abrasive, notwithstanding the blades are made of Ni-hard or similar alloy which is highly resistant to the attrition action of the abrasive. The shell 26 is also made of Ni-hard, or similar material, which is highly resistant to the action of the abrasive, and this is true also of the other parts that are subjected to attrition action.

The machine is readily assembled by fixedly securing the hub 2 to the driving shaft 3 and clamping the flat ring 5 in place by screws 4. This ring 5 is then inserted into the axial opening of the outer disk 1 of the rotor head. Then disk 6 is affixed to disk 1 by the screws shown. Next, the propeller blades 10 are placed in position in the slots 7 in the inner disk 6 of the rotor head. Then the impeller is placed in position with slots 16 receiving the heads of bolts 4 and secured by the bolt 17 which when screwed home also locks all of the propeller blades in place. The registration of the heads of screws 4 with the notches 16 establishes the proper angular relationship between the impeller blades 15 and propeller blades 10.

The shell 26 and plate 23 having been assembled with the opening 27 in the general position desired in reference to a vertical plane intersecting the axis of the spout section 22, the plate

23 is fixedly secured to the adjacent casing wall 24 by bolts 33. Then by means of bolts 36 the shell is given such final angular adjustment as may be found desirable, the nut 41 is then screwed home, and finally bolts 36 are also screwed home. Assuming the opening 27 is located in about the eleven o'clock position—reference being to a clock dial—and that the rotor is travelling in an anti-clockwise direction at a speed approximating 2250 R. P. M., the abrasive fed through the supply spout will flow into and lengthwise of the axial opening in the impeller, and will be picked up by the impeller blades and propelled through opening 27 in a stream moving outward and across the orbital path of the inner edge of the propeller blades, and in a direction at an acute angle to the face of each propeller blade as it makes initial contact with the stream. The inner end of the propeller blade will cut off the outer portion of the stream, and such slug of abrasive will be picked up by the inner end portion of the blade and carried along by the blade. By centrifugal force the abrasive will be caused to move lengthwise of the face of the blade, and after the blade has travelled through an arc of about 90 degrees the abrasive will commence to glide off of the outer edge of the blade. This discharge will continue during the travel of the blade through a succeeding arc of about the same length.

As will be noted, each propeller blade is longer than the diameter of the impeller, and the inner edges of the former travel in a path contiguous to the periphery of the shell. The latter is important for minimizing the force of the impact of the inner end portions of the blade with the abrasive stream.

Viewed in the direction of the axis of the rotor, the stream as a whole discharging from the periphery of the rotor is approximately fan-shape and its pattern at the point where it strikes the surface of the work is substantially oblong.

The velocity of the particles of abrasive leaving the outer edge of the propeller blade in reference to its front face is the resultant of the velocity acquired by the abrasive in its movement with the blade, and the velocity acquired in its movement lengthwise of the blade. These two velocities may respectively be called tangential or angular and centrifugal velocities.

The machine as described, with a rotor of approximately 19 inches in diameter, travelling at a speed of approximately 2250 R. P. M., has the capacity to throw at an abrading velocity upward of 30,000 pounds of metallic abrasive per hour.

As will be observed, the principle of the operation of the machine described is such that the stream discharged from the rotor strikes the work substantially diametrically opposite from the position where the stream from the transfer mechanism enters the rotor. Otherwise stated, there is a wide separation—of the order of about 90 degrees—between the position (arc of movement) where the propeller blade picks up the abrasive and the position where the discharge commences of the abrasive from the outer edge of the blade, notwithstanding each blade may be straight from end to end and radially disposed.

In about 90 percent of the operations in which is used the machine described, the work is located below the rotor and in consequence the abrasive fed coaxial of the rotor must be thrown upwardly to be picked up successively by the propeller blades as they pass through an arc almost directly above the axis of rotation of the rotor.

It will also be noted that the abrasive entering the axis of the rotor and which is mechanically propelled outwardly across the path of travel of the inner edges of the propeller blades is not obstructed at all by the carrier for the blades, and, indeed, it is not obstructed to any consequential extent by the blades themselves. To reduce the latter practically to a knife edge, the blades are bevelled at their inner edges at 48. This machine does not require a shroud having a wall concentric with a large part of the periphery of the rotor and contiguous to the same for arresting the abrasive discharged by the blades save as they pass through an arc of limited length and returning the abrasive within the orbit of the blades or otherwise. It is also apparent that the abrasive in this machine passes directly from the outer edges of the propelling blades unobstructedly towards the work.

It will also be noted that not only are the inner edges of the impeller blades 15 spaced apart sufficiently to provide an unobstructed axial opening or passage of ample size to receive the abrasive from the feed spout, but that there is a wide space between the front or throwing face of each blade and the rear wall of the immediately preceding blade.

In construction and principle of operation our machine is radically different from the type of machine in which the velocity of the abrasive discharged from the periphery of the rotor is due entirely, or in large measure, to the force generated by the collision of a substantially radially disposed batter surface located adjacent the periphery of the rotor with the abrasive which is shot against the same, or discharged into its path from a conduit through which the abrasive travels. In contradistinction, in a machine exhibiting our invention the rotor is not provided with narrow passageways so shaped as to guide the abrasive against or into the path of an abruptly disposed surface, but the abrasive is picked up by the inner end portion of the blade with a low order of impact, moves lengthwise of the blade without abrupt change in direction, and finally glides off of its outer edge as stated; the action being somewhat similar to that which occurs in the game of jai alai in which, by the wide sweep of the player's arm, the ball is caused to travel lengthwise of the face of the cesta and slide off of its outer edge to travel at great velocity towards the wall of the court.

Our machine in construction and principle of operation is also radically different from the type of mechanical blasting machine which has been proposed, wherein the abrasive is discharged downwardly both into and from the rotor.

Our machine is also radically different from the type of mechanical blasting machine in which a shroud or baffle member encloses practically all but a small arc of the rim of the rotor for arresting the abrasive discharged from the rim save at said unenclosed portion of the rim.

Our machine is a centrifugal blasting machine in which the means for effecting directional control, or adjustable directional control, is incorporated in the machine itself, and such means includes a transfer mechanism interposed between a stationary abrasive supply spout and the rotor so contrived that all, or practically all, of the abrasive supplied by the spout will be picked up by the inner end portions of the propeller blade, or blades, of the rotor during their travel through

a short arc, will glide endwise of the blades without material abrupt change in direction, and will glide off of the outer edges of the blades during their travel through an arc of approximately 90 degrees, the position of which will correspond to the first-named arc.

The present application is intended as a continuation in part of our application Serial No. 726,188, filed May 17, 1934.

The foregoing description taken in connection with the accompanying drawings will enable the skilled in the art to construct a machine exhibiting our invention which will operate efficaciously. The parts and combinations of parts of our invention which we desire to patent are particularly set forth in the appended claims.

We claim:

1. In a centrifugal blasting machine and in combination, a rotor comprising a head and thin, substantially oblong shape, propelling blades, said head comprising inner and outer disks attached to each other and of substantially the same diameter and each provided with an axial opening, that in the outer disk being of smaller diameter than the opening in the inner disk, a driving shaft, a hub carried thereby and attached to the outer disk and provided with a circular protuberance fitting within the axial opening in the outer disk, said inner disk being provided with a radial groove opening out at one end through the wall of its axial opening and terminating at its opposite end adjacent its periphery in an undercut end wall, projections at the opposite ends of one lengthwise edge of each propeller blade, the marginal portion of said lengthwise edge being detachably held in said groove and the projection at the outer end of the blade interfitting with the undercut end wall of the groove, a cup shape member arranged coaxial of the rotor having a marginal edge portion fitting within the axial opening in the outer disk and having a peripheral flange cooperating with the projection at the inner side of the blade, a bolt for drawing the cup toward the hub and the peripheral flange in clamping engagement with the projection at the inner edge of the propelling blade, a plurality of impeller blades supported at corresponding ends by said cup with their lengthwise edges spaced from one another to provide an unobstructed axial opening, a supply spout having a discharge outlet registering with the axial opening, a plate carrying the spout, a casing wall to which the plate is attached, a container having a cylindrical wall with its outer surface contiguous the orbit of the inner ends of the propeller blades and its inner surface contiguous the orbit of the outer edges of the impeller blades, said peripheral wall having a discharge opening therethrough, the ends of which are between spaced apart planes parallel with the longer edges of the propeller blades and intersecting said blades a distance within said edges, said container having an end wall with an axial opening receiving the closed end of the cup shape member and an opposite end wall provided with an axial opening, means for supporting said container from said plate including an axial boss on the plate fitting within the axial opening in the last named end wall of the container, said wall having spaced apart tapped openings therein and the said plate having arcuate slots for registration with said openings, and bolts having their shanks extending through the arcuate slots and engaging the tapped openings and their heads in clamping engagement with the outer face of the plate.

2. A cup member provided with a peripheral flange for clamping a propeller blade of a blasting machine in the carrier therefor, and a plurality of radially disposed impeller blades supported by the said member, the inner edges of the impeller blades being parallel to an axis coextensive with the axis of the cup and spaced apart to provide an unobstructed abrasive receiving opening.

3. A cup member provided with a peripheral flange for clamping a propeller blade of a blasting machine in the carrier therefor, said member having a substantially flat bottom wall, and a plurality of radially disposed impeller blades supported by the said member and extending from said wall, the inner edges of the impeller blades being parallel to an axis coextensive with the axis of the cup and spaced apart to provide an unobstructed abrasive receiving opening, and a conical band integral with the ends of the blades opposite to the bottom wall.

4. In a centrifugal abrading machine, a rotor having a plurality of abrasive propelling blades provided thereon, said blades being disposed substantially radially and terminating short of the axis of said rotor to define a central abrasive-admitting space, an abrasive impeller axially aligned with said rotor and secured thereto, said impeller being disposed within said central space and comprising a pair of side wall elements joined by a plurality of substantially radial abrasive impelling vanes which terminate short of said axis, one of said side wall elements being of hollow formation and extending for a considerable axial distance away from said rotor to define an abrasive conduit, means for feeding abrasive to said conduit, and a shield device disposed between said impeller vanes and said propelling blades for directing abrasive from said impeller vanes to a predetermined angular region of said propelling blades.

5. The abrading machine described in claim 4, wherein the internal surface of the conduit defined by said side wall element inclines toward said rotor and communicates with the spaces between said vanes.

6. The abrading machine described in claim 4, wherein said means for feeding abrasive comprises a pipe telescoped into the conduit provided by said side wall element.

7. In a centrifugal blasting machine, a rotor having a plurality of substantially radially disposed blades provided thereon, said blades terminating short of the axis of said rotor, a substantially cylindrical abrasive feeding device of an external diameter less than the radius of the rotor positioned coaxially of said rotor and having a discharge opening therein disposed to one side of the axis of said rotor and located between the planes of rotation defined by the sides of said blades for delivering abrasive to the inner ends of said blades, said blades terminating sufficiently close to said feeding device to pick up the abrasive with a minimum impact and said blades having substantially smooth and uninterrupted abrasive-propelling surfaces of sufficient length to accelerate the abrasive smoothly and continuously and without abrupt change from the point of pick-up thereof by each blade to its outer edge and discharge it therefrom at an abrading velocity when said rotor is rotated at optimum speed, a rotatable impeller comprising a plurality of impeller vanes disposed within said

feeding device, said vanes extending to a region closely adjacent the axis to define a comparatively small axially extending passage, and means for introducing abrasive into said passage and over the inner edges of said vanes, said vanes being operable to impel abrasive through said discharge opening.

8. In a centrifugal blasting machine, a rotor having a plurality of substantially radially disposed propeller blades provided thereon, said blades terminating short of the axis of said rotor, an abrasive feeding device positioned coaxially of said rotor and having a discharge opening therein disposed to one side of the axis of said rotor and located between the planes of rotation defined by the sides of said blades for delivering abrasive to the inner ends of said blades, rotatable means disposed in said feeding device for impelling abrasive through said discharge opening, said means comprising a plurality of impelling vanes connected to said rotor, said vanes being disposed substantially radially and extending inwardly to a region closely adjacent the axis to define a comparatively small axially disposed passage, and means for introducing abrasive into said passage and over the inner edges of said vanes, said propeller blades terminating sufficiently close to said feeding device to pick up the abrasive with a minimum impact and said blade having substantially smooth and uninterrupted abrasive propelling surfaces of a length which is a plurality of times greater than that of the width of said impelling vanes to accelerate said abrasive smoothly and continuously without abrupt change in its general direction of travel and discharge it from the outer ends of said blades at an abrading velocity when said rotor is rotated.

9. In an abrading machine, a rotor having a plurality of substantially radially disposed blades provided thereon, said blades terminating short of the axis of said rotor, a substantially cylindrical abrasive feeding device of an external diameter less than the radius of the rotor positioned coaxially of said rotor and having a discharge opening therein disposed to one side of the axis of said rotor and located between the planes of rotation defined by the sides of said blades for delivering abrasive across the orbit of the inner ends of said blades, said blades terminating sufficiently close to said feeding device and the axis of the rotor to pick up the abrasive with a low impact and said blades having substantially smooth and uninterrupted abrasive-propelling surfaces of sufficient length to accelerate the abrasive smoothly and continuously and without abrupt change and discharge it from the outer ends of said blades at an abrading velocity when said rotor is rotated at optimum speed, a rotatable impeller disposed within said feeding device, said impeller including spaced side wall portions having a plurality of impeller vanes disposed therebetween said vanes extending to a region adjacent to and spaced from the axis to define an unobstructed axially extending passage, and means for introducing abrasive into said passage and over the inner edges of said vanes, said vanes being operable to impel abrasive through said discharge opening and said side wall portions being operable to direct the abrasive through said discharge opening.

10. In a centrifugal blasting machine and in combination, a rotor, an brasive supply with a discharge port coaxial the axis of the rotor and an interposed axially disposed transfer mechanism supplying the abrasive to the rotor and controlling the arc of discharge of the abrasive stream from the periphery thereof, said rotor comprising a head and a plurality of thin, widely separated, independently functioning blades, with the spaces therebetween free for the outward travel of the abrasive stream from the transfer mechanism across the orbit of the inner edges of the rotor blades, each rotor blade having its propelling face highly resistant to abrasion, without material abrupt change in direction, and extending substantially from the inner edge to the outer edge of the blade, the latter edge of the blade terminating at or adjacent the periphery of the head and said inner edge thereof terminating in close juxtaposition to the transfer mechanism, and each blade in radial length exceeding the radius of the outer member of the latter, said transfer mechanism including a multi-bladed, axial passage, impeller and an outer member determining the position of the arc of pick-up by the inner ends of the rotor blades of the abrasive propelled by the impeller.

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