Dec. 1, 1942. C. E. UNGER 2,304,041

CENTRIFUGAL BLASTING MACHINE

Filed July 12, 1940 2 Sheets-Sheet 1

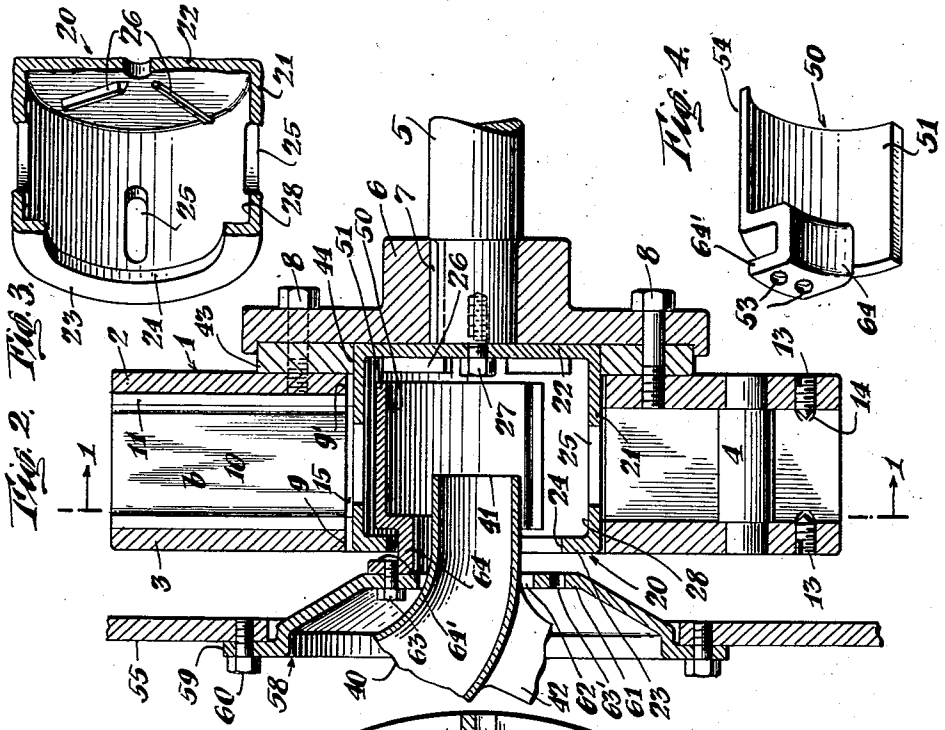


Fig. 3.

Fig. 2.

Fig. 4.

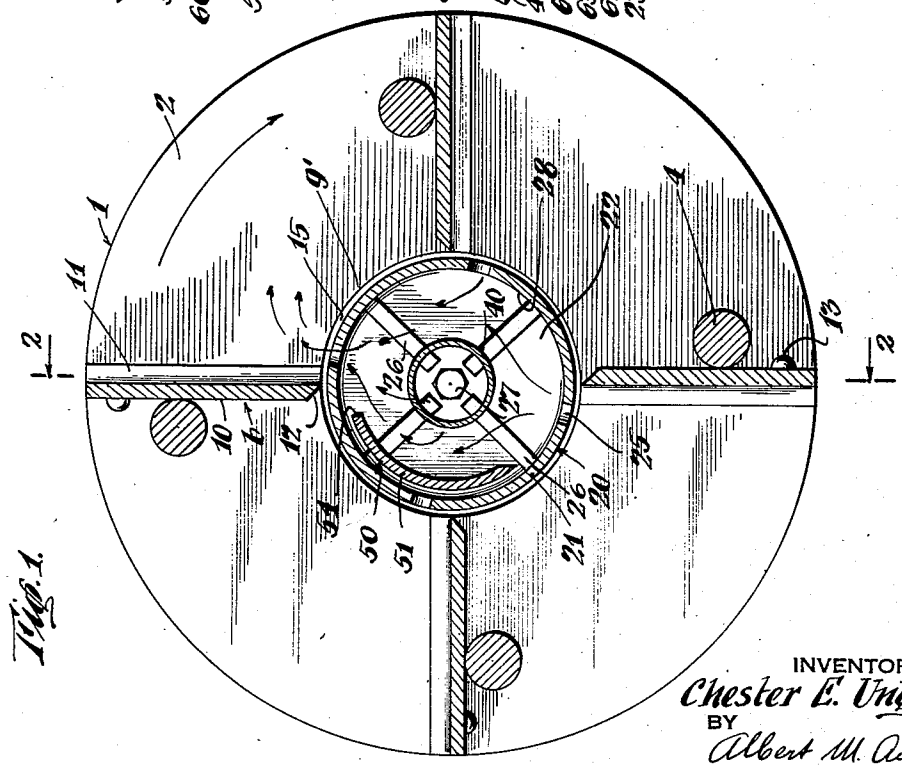


Fig. 1.

INVENTOR
Chester E. Unger
BY
Albert M. Austin
ATTORNEY

Dec. 1, 1942. C. E. UNGER 2,304,041

CENTRIFUGAL BLASTING MACHINE

Filed July 12, 1940 2 Sheets-Sheet 2

Fig. 6.

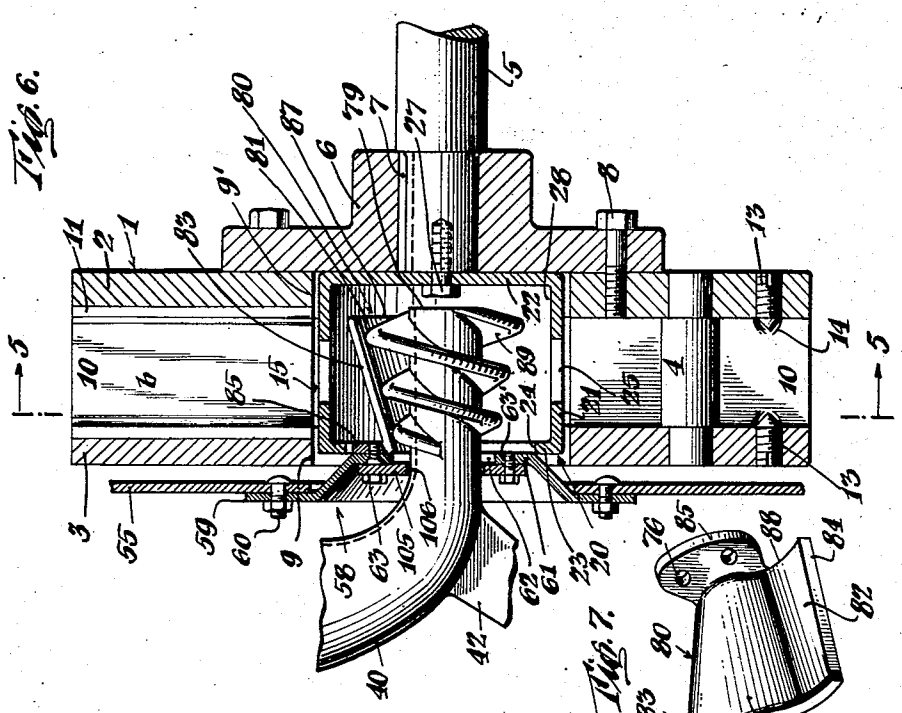
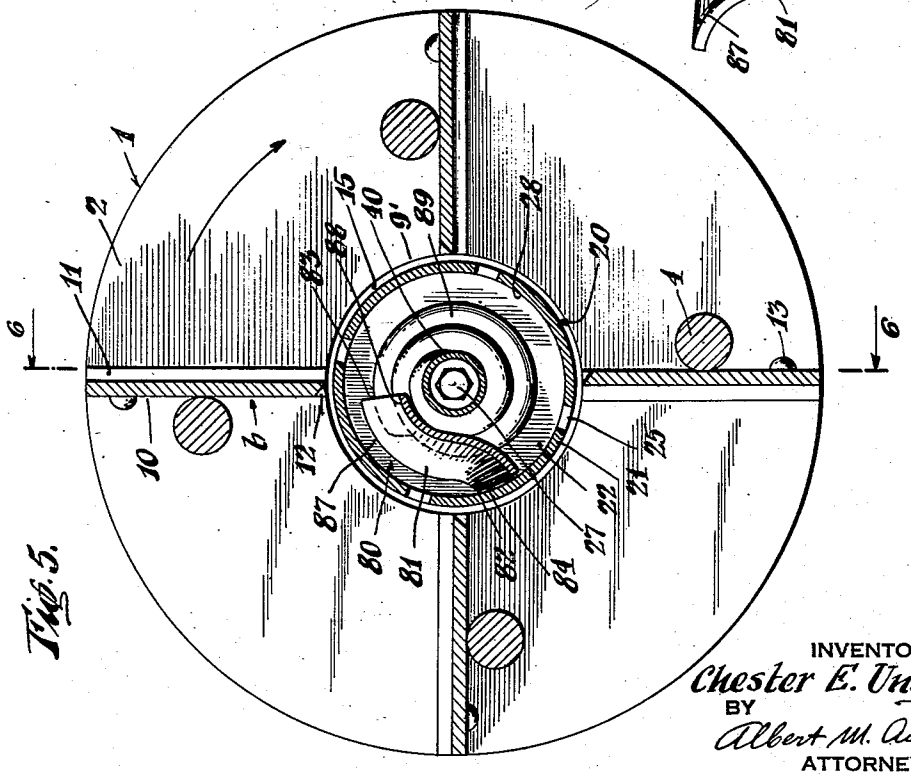


Fig. 7.

Fig. 5.



INVENTOR
Chester E. Unger
BY
Albert M. Austin
ATTORNEY

Patented Dec. 1, 1942

2,304,041

UNITED STATES PATENT OFFICE

2,304,041

CENTRIFUGAL BLASTING MACHINE

Chester E. Unger, Mishawaka, Ind., assignor to The American Foundry Equipment Company, Mishawaka, Ind., a corporation of Delaware

Application July 12, 1940, Serial No. 345,035

15 Claims. (Cl. 51—9)

This invention relates to centrifugal blasting machines, and more particularly to that type of blasting machine which comprises a bladed rotor having means positioned centrally thereof for directing the abrasive into the path of rotation of the blades of the rotor whereby the abrasive thrown by the blades may be directed in a confined or concentrated stream against the article undergoing treatment positioned at one side thereof.

In accordance with this invention, the centrifugal blasting machine embodies a bladed rotor which may comprise a pair of spaced side wall discs rigidly connected together and fixed to the end of a high speed shaft. Abrasive throwing blades are positioned between and supported by the side wall discs and are arranged in spaced generally radially extending relationship with the inner ends of the blades extending short of the axis of rotation of the rotor to provide a central space therein.

An important feature of this invention comprises the provision of a tubular impeller positioned within the central space of the bladed rotor and fixed to rotate therewith, which is so designed as to effect substantially even distribution of the abrasive over the full width of the advancing face of the blades. The abrasive is fed into the tubular impeller by a suitable stationary feed spout which discharges the abrasive onto the inside surface of the tubular impeller. The tubular side wall of the impeller is provided with a plurality of discharge ports or slots whose side edges are positioned between the side flanges of the channel shaped blades. The peripheral extent of each slot is relatively short so that the slot is relatively narrow in axial extent. The number of slots employed are preferably equal in number to the abrasive throwing blades and each slot is preferably positioned slightly in advance of its corresponding blade. The abrasive deposited on the interior surface of the tubular side wall of the impeller is held in hugging relationship to the inside surface by centrifugal force. Agitating lugs fixed to the inside surface of the impeller may in some cases be provided to assist in bringing the abrasive deposited therein up to peripheral speed. These lugs also serve to assist the distribution of the abrasive between the narrow discharge ports so that substantially uniform discharge of the abrasive through the full axial width of the discharge ports is effected.

When the bladed rotor is rotated at blasting speeds the blades thereof exert a fan action which normally produces high velocity air movements within the central space of the wheel.

A baffle plate or deflector segment is positioned within the tubular impeller and serves to baffle the air currents generated by the rapidly rotating blades within the central space of the rotor, so that the ports of the tubular impeller when rotating through an area which is generally opposite the arcuate side wall and the heel of the deflecting segment, appear to experience a high velocity inflow of air through the ports, which prevents any substantial quantity of abrasive escaping outwardly through the ports as they rotate through this area. This area, through which the air flows at high velocity through the ports of the tubular impeller inwardly into the same, might be referred to as a "pressure area." The high velocity air currents escape from the interior of the rotating tubular impeller through the ports thereof when they move over a relatively short peripheral area which is adjacent but slightly in advance of the tip end of the deflector segment, which area might be termed a "suction area." The outflowing air at the suction area obviously does not obstruct but facilitates the discharge of abrasive through the discharge ports of the impeller as they move through the suction area. The inside surface of the arcuate side wall of the deflector segment also serves to guide any abrasive thrown thereagainst along the inside surface until it is free to discharge from the tip end of the deflector segment. The narrow discharge ports in the tubular impeller which have an axial width approximating that of the throwing surface of the blades perform the highly important function of effecting substantially uniform distribution of the abrasive directed onto the inner ends of the advancing blades through substantially the full abrasive throwing width thereof.

Another feature of this invention is the provision of a spiralling rib or flange fixed to the outer periphery of the end portion of the feed spout which extends into the tubular impeller. This spiralling rib further facilitates the distribution of the abrasive within the tubular impeller so that the abrasive will discharge substantially uniformly through the full axial width of the narrow discharge ports thereof. This spiralling rib remains substantially stationary while the tubular impeller and the bladed rotor rotate. This spiralling rib also serves to agitate the abrasive within the tubular impeller so that the abrasive is more effectively brought under the influence of the controlled and deflected air currents

generated by the bladed rotor within the tubular impeller.

Various other features and advantages of the invention will be apparent from the following particular description and from an inspection of the accompanying drawings.

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

Fig. 1 is a cross-sectional view of a centrifugal blasting machine having the abrasive deflecting device positioned within the tubular impeller, this view showing the machine as it appears when looking in the direction of the arrows along line 1—1 of Fig. 2;

Fig. 2 is a cross-sectional view of this machine as it appears when looking in the direction of the arrows along the line 2—2 of Fig. 1;

Fig. 3 is a perspective view, partly in section, of the abrasive impeller device associated with this machine;

Fig. 4 is a perspective view of a normally stationary deflector employed to effect directional control of the abrasive from the bladed rotor of the machine shown in Figs. 1 and 2;

Fig. 5 is a cross-sectional view of a centrifugal blasting machine having modified means for feeding and controlling the direction of abrasive discharged from the bladed rotor, this view being taken along line 5—5 of Fig. 6;

Fig. 6 is a cross-sectional view of this centrifugal blasting machine as it appears when looking in the direction of the arrows along line 6—6 of Fig. 5; and

Fig. 7 is a perspective view of the abrasive deflecting device employed to effect directional control of the abrasive fired by the bladed rotor forming a part of the machine shown in Figs. 5 and 6.

Similar reference characters refer to similar parts throughout the several views of the drawings and the specification.

The centrifugal blasting machines which have been shown in the drawings to illustrate embodiments of this invention, generally comprise a bladed rotor 1 mounted on the end of a high speed shaft which has associated therewith a device or devices for giving to the abrasive supplied thereto through a suitable feed spout an initial velocity in the general direction of rotation of the blades of the rotor and a device or devices disposed generally centrally of the bladed rotor for controlling the direction of discharge of the abrasive fired by the rapidly rotating blades of the rotor.

Generally speaking, the bladed rotor, constructed of suitable metal, may comprise a pair of spaced side wall forming discs 2 and 3 which are held in fixed spaced relationship by means of suitable studs or spacers 4 which are welded or otherwise rigidly fixed to the side wall discs 2 and 3. The bladed rotor is mounted upon a sturdy shaft 5 which rotates within suitable spaced bearings, the shaft being suitably connected to a suitable power source so as to be rotated at high speed. A hub 6 is fixed to the end of the shaft 5 as by means of a suitable spline 7 and the hub flange is suitably secured as by bolts 8 to the adjacent side wall disc 2. The front side wall disc 3 is preferably provided with a central circular opening defined by a circular edge 9 and the rear disc 2 may be provided with a similar circular opening of substantially the same diameter defined by an inner circular edge 9'.

A plurality of throwing blades *b*, generally formed of wear resistant metal, are radially arranged in spaced relationship between the metal side wall discs 2 and 3. Four to eight such blades *b* are generally provided. These blades are preferably channel shaped in cross-section, defining an abrasive receiving bottom wall 10 and a pair of side flanges 11 to retain the abrasive within the confines of the advancing face of the bottom wall 10. Each blade is inserted into paired slots or grooves formed in the side wall discs 2 and 3, which grooves support the blades in radial spaced arrangement. The inner ends 12 of the blades are generally in approximate alignment with the peripheral edges 9 and 9' which define the central openings in the side wall discs 3 and 2 respectively. As thus constructed, the inner ends of the blades *b* and the circular openings in the side wall discs 2 and 3 define a central space 15 within the bladed rotor within which the abrasive impelling and controlling devices may be positioned. The blades *b* are removed when worn and fresh blades inserted through the periphery of the rotor, and may be held in operative position by set screws 13 threaded into the side wall plates 2 and 3, the inner ends of these set screws extending into suitable recesses 14 in the side edges of the blades. By manipulating the set screws 13 the blades *b* can be easily withdrawn through the periphery of the rotor.

Referring more particularly to the abrasive blasting machine illustrated in Figs. 1 to 4 inclusive, a generally cylindrical impeller device 20, cast from wear resistant metal, is positioned within the central space of the rotor. This impeller device, shown separately in Fig. 3, comprises a cylindrical wall 21 which is closed at the inner end by end wall 22. This end wall may be designed to seat against the inside face of the hub 6 and may be fixed to rotate with the bladed rotor by means of a bolt 27 which extends through the end wall 22 of the impeller device and is threaded into a threaded opening in the end of the drive shaft 5. The front end of the impeller device 20 may be provided with an inturned flange 23 which defines a circular opening 24 into which the discharge end of the abrasive supply spout 40 may be inserted. The tubular wall 21 of the impeller device may be provided with a plurality of spaced discharge openings 25 preferably equal in number to the number of blades *b* of the rotor. The outer periphery of the tubular side wall 21 of the impeller extends closely adjacent the inner ends 12 of the blades *b*.

The tubular impeller device is preferably so positioned that each discharge opening 25 is positioned slightly in advance of the corresponding blade *b* of the rotor so that the abrasive will discharge from the opening 25 with the least interference with the inner ends 12 of the blades *b*. The tubular impeller device is also so positioned that the side edges of the opening 25 extend generally between the side flanges 11 of the blades *b*. The openings 25 are preferably relatively narrow or short in their peripheral extent so that in this machine substantially uniform quantities of abrasive will discharge through each opening. The inside surface 26 of

the tubular impeller device provides a circular rotating shelf upon which the abrasive is deposited as it discharges from the discharge end 41 of the abrasive supply spout 40. The abrasive *a* deposited on the shelf 28 defined between the end wall 22 and the adjacent side edges of the openings 25 rotates with this shelf and collects thereon in a ring-shaped pile until its angle of repose is overcome, when it drops out through the narrow openings 25. To bring the abrasive up to a speed approaching the peripheral speed of the shelf 28, a plurality of radially extending agitating lugs 26 are preferably secured to the inside face of the end wall 22.

In order that a central space may be provided within the bladed rotor deep enough to receive the tubular impeller 20 and provide an adequate abrasive supporting shelf 28, the hub 6 may be provided with an internal circular recess. Such a circular recess may be made by providing as a part of the hub a circular plate 43 having a circular opening 44 on the inside face thereof, which is secured to the side wall disc 2 of the rotor by the bolts 8. It will be appreciated that, if desired, the plate portion 43 may be formed as an integral part of the hub.

The abrasive supply spout 40 is supported upon a suitable bracket 42 fixed to a suitable stationary mounting. The abrasive *a* supplied to the feed spout 40 discharges from the inner end 41 thereof and drops upon the shelf 28 of the tubular impeller. The abrasive dropped on the shelf 28 quickly assumes the speed of rotation of the shelf, assisted by the agitating lugs 26, and collects on this shelf until the angle of repose of the pile of abrasive deposited thereon is overcome.

Directional control of the thrown abrasive is effected by the provision of an arcuate baffle plate or segment which is positioned within the tubular impeller in the manner illustrated in Figs. 1 and 2.

The control cage segment 50 may be formed as illustrated perspective in Fig. 3, comprising an arcuate baffle wall portion 51 having an arcuate contour of such a nature that it can be positioned within and generally conform to the circular contour of the inside face of the tubular side wall 21 of the impeller. The baffle wall 51 is illustrated as being approximately 90° in length, approximately the minimum length at which it should be made to effect a fair degree of directional control. More accurately defined directional control can be obtained if the baffle wall 51 is made up to 120° or 180° or more in length.

The control cage segment 50 is suitably supported in a normally stationary position during operation, but is preferably made adjustable so that the direction of discharge of the thrown abrasive may be controlled. As shown in Fig. 2, a suitable support for the control cage segment may comprise a supporting plate 55 having a central opening within which a dish-shaped plate 58 is positioned. The plate 58 is provided with an outturned flange portion 59 secured to the supporting plate 55 as by screws 60. The bottom wall 61 of the dish-shaped supporting member is provided with a central opening 62 through which the discharge end 41 of feed spout 40 extends. The control cage segment 50 may be provided with a U-shaped formation 64 so designed as to extend around the inturned flange 23 of the tubular impeller 20. The U-shaped formation 64 presents a flange portion 64' having threaded apertures 53 through which securing bolts 63 extending through spaced apertures 63' in the bottom wall 61 of the dish-shaped member 58 extend. The spaced holes or slots 63' in the bottom wall 61 may be arranged in a circle so that the securing screws 63 may be selectively inserted through these openings or slots to attach the control cage segment in any desired operative position.

Abrasive supplied to the feed spout 40 discharges from the inner end 41 thereof into the tubular impeller 20 where it collects upon the inside surface of the tubular wall 21 thereof. The control cage segment 50 serves to baffle the high velocity air currents so that during high speed rotation of the bladed rotor air is drawn through the ports 25 during a predetermined clockdial position during rotation thereof, so as to prevent escape of any substantial quantity of abrasive at this point. The segment 50 operates to force the air out through the ports 25 during the remaining predetermined clockdial position during rotation so as to permit escape of abrasive at this area. The control cage segment 50 positioned within the tubular impeller as illustrated effects a measurable degree of directional control of the thrown abrasive. The direction of discharge of the thrown abrasive may be regulated by shifting the tip end 54 of the control cage segment 50 to the proper clockdial position.

There is shown in Figs. 5 and 6, an abrasive blasting machine which includes a bladed rotor 1 and a tubular abrasive impelling device similar to that illustrated in Figs. 1 and 2. In this construction, the abrasive supply spout 40 is provided with means for scraping the abrasive out through the discharge ports 25 in the tubular impeller 20 and an abrasive deflecting device 80 which extends into the tubular impeller 20 and is adjustably supported in normally stationary position.

The abrasive deflecting device 80, illustrated in perspective in Fig. 7, may be formed from cast metal having a generally arcuate body portion 81 and a trailing end portion 82. A foot portion 85 adjacent the side edges thereof is provided with threaded openings 76 through which extend the securing bolts 63 extending through a selected pair of spaced openings 63' in the bottom wall portion 61 of the dish-shaped supporting plate 58. It will be noted that the inner side edge 87 of the deflector plate 80 is longer and of greater radius than the outer side edge 88 thereof, so that when the deflector plate is mounted in position within the tubular impeller 20 it assumes the position generally illustrated in Figs. 5 and 6. The tip end 83 and the trailing end 84 extend generally parallel to the axis of the rotor. The baffle member 80 serves to baffle the air currents generated within the rapidly rotating rotor so that the abrasive will be discharged into the path of rotation of the blades *b* in a direction determined by the clockdial position of the tip end 83 of the deflector member.

It will be noted by referring to Fig. 6 that the end portion 79 of the feed spout extends into the tubular impeller 20 for a substantial distance and that a spiralling vane 89 is integrally or otherwise fixedly secured to the outer periphery thereof. The spiralling vane 89 is shown as comprising three complete turns, each turn increasing in diameter toward the open inner end of the spout extension 79. It is appreciated that the vane 89 is normally stationary during rotation of the bladed rotor. The vane 89 serves to

guide the abrasive discharged into the tubular rotating impeller 20 from the inner end thereof to a position where it may be discharged through the full axial width of the ports 25 of the impeller 20. It will be noted from Figs. 5 and 6, that the arcuate body portion 81 of the deflector member 80 is so positioned that its inner surface is relatively closely adjacent the periphery of the spiralling vane 89 and also that the periphery of the spiralling vane 89 is spaced some distance from the inside surface of the tubular side wall 21 of the impeller 20.

The feed spout 40, its end extension 79 and the spiralling vane 89 formed as an integral unit, are supported in fixed stationary position during operation of the machine by means of a suitable supporting device such as the bracket 42. A removable collar 105, having an opening 106 through which the feed spout extends, closes the enlarged opening 62 in the dish-shaped supporting member 58. Bolts 63 extending through openings in the collar 105 may be screwed into threaded apertures in the bottom wall 61 of the dish-shaped support to retain the same in position.

In operation, abrasive is supplied to the supply spout 40 and discharges from the end of the end extension 79 into the rapidly rotating tubular impeller 20 which is fixed to and rotates with the bladed rotor 1. The spiral vane 89 scrapes the abrasive deposited on the inner surface of the tubular side wall 21 of the impeller 20 forwardly so that the abrasive is discharged through substantially the full axial width of the discharge ports 25 therein. The shield member 80 acts to direct the abrasive onto the inner ends of the blades at a predetermined position.

It will be noted by referring to Fig. 5 that the trailing end 84 of the baffle member 80 is positioned close to the interior surface of the tubular wall 21 of the impeller 20, while the tip end 83 thereof is positioned close to the periphery of the spiral vane 89. The baffle member 80 as illustrated in Figs. 5 and 6 has an arcuate length of 90°, which is the shortest length that should be employed to achieve a fair measure of directional control. This baffle member 80 may be made up to 300° in arcuate length with correspondingly improved directional control results. The baffle member 80 serves to baffle the air currents so that a stream of air at relatively high velocity flows into the tubular impeller through the impeller ports 25 during that portion of their path of rotation which is opposite the baffle and adjacent the trailing end 84 thereof, producing what might be termed a "pressure area," which prevents any substantial discharge of abrasive through the discharge ports 25 when moving through this pressure area. The high velocity air stream and the abrasive escape from the tubular impeller outwardly through the ports 25 during that portion of their path of rotation which is adjacent but in advance of the tip end 83 of the deflecting member 80, producing what might be termed a "suction area." The spiralling vane 89 presents a generally conical shaped peripheral edge which also cooperates with the arcuate conical portion 81 of the baffle member 80 to effect directional control results.

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

What is claimed is:

1. A centrifugal abrasive blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, a tubular impeller positioned within said central space fixed to rotate with said rotor and operative to retain abrasive therein for a sufficient interval to transmit to the abrasive a centrifugal speed corresponding to the speed of rotation of the impeller, said impeller having a plurality of spaced abrasive discharge ports in the tubular side wall thereof, an abrasive supply spout for conducting abrasive into said tubular impeller, and a normally stationary control device having an arcuate shaped side wall portion extending into said impeller and overlapping a limited arcuate section of the tubular side wall of said impeller and covering the ports in said section, said control device being operable to direct the abrasive through certain of the uncovered ports of said impeller and into the path of rotation of the inner ends of said blades during a predetermined limited arc of rotation thereof.

2. A centrifugal abrasive blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, a tubular impeller positioned within said central space fixed to rotate with said rotor, said impeller having a plurality of spaced abrasive discharge ports in the tubular side wall thereof, an abrasive supply spout for conducting abrasive into said tubular impeller, a normally stationary tubular control cage extending into said central space and enclosing the discharge ports of said impeller, said control cage having a discharge opening in the tubular side wall of limited peripheral extent positioned between the side edges of said blades operable to direct the abrasive into the path of rotation of the inner ends of said blades during a predetermined limited arc of rotation thereof, and means for adjustably supporting said control cage in normally stationary position.

3. A centrifugal abrasive blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, a tubular impeller positioned within said central space fixed to rotate with said rotor and operative to retain abrasive therein for sufficient interval to transmit to the abrasive a centrifugal speed corresponding to the speed of rotation of the impeller, said impeller having a plurality of spaced abrasive discharge ports in the tubular side wall thereof, each of said ports having the side edges thereof positioned between the channel confines of the adjacent blade, said ports being relatively short in peripheral extent, a feed spout for conducting abrasive into said tubular impeller, and

a normally stationary control device having an arcaute shaped wall portion extending into said impeller and covering a limited number of the ports in said impeller, said control device being operable to direct the abrasive through certain of the uncovered ports in said impeller and into the path of rotation of the inner ends of said blades during a predetermined limited arc of rotation thereof.

4. A centrifugal abrasive blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, a tubular impeller positioned within said central space fixed to rotate with said rotor and operative to retain abrasive therein for a sufficient interval to transmit to the abrasive a centrifugal speed corresponding to the speed of rotation of the impeller, said impeller having a plurality of spaced abrasive discharge ports in the tubular side wall thereof, each of said ports having the side edges thereof positioned between the channel confines of the adjacent blade, said ports being relatively short in peripheral extent, a feed spout for conducting abrasive into said tubular impeller, deflecting elements fixed to the interior of said tubular impeller for guiding the abrasive to the discharge ports thereof, and a normally stationary control device having an arcuate side wall portion extending into said impeller and covering a limited number of the ports in said impeller, said control device being operable to direct the abrasive through certain of the uncovered ports of said impeller and into the path of rotation of the inner ends of said blades during a predetermined limited arc of rotation thereof.

5. A centrifugal abrasive blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, a tubular impeller positioned within said central space fixed to rotate with said rotor and operative to retain abrasive therein for a sufficient interval to transmit to the abrasive a centrifugal speed corresponding to the speed of rotation of the impeller, said impeller having a plurality of spaced abrasive discharge ports in the tubular side wall thereof equal in number to the number of blades carried by said rotor, each of said ports having the side edges thereof positioned between the channel confines of the adjacent blade, said ports being relatively short in peripheral extent and positioned slightly in advance of their corresponding blades, a feed spout for conducting abrasive into said tubular impeller, and an arcuate shaped deflector wall extending into said central space and interiorly around a limited arcuate section of the tubular side wall of said impeller and covering the ports in said section whereby the discharged abrasive will be directed through certain of the uncovered discharge ports in said impeller.

6. A centrifugal abrasive blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, a tubular impeller positioned within said central space fixed to rotate with said rotor, said impeller having a plurality of spaced abrasive discharge ports in the tubular side wall thereof, each of said ports having the side edges thereof positioned between the channel confines of the adjacent blade, said ports being relatively short in peripheral extent, a feed spout for conducting abrasive into said tubular impeller, an arcuate shaped deflector plate extending into said impeller and overlapping a limited arcuate section of the tubular side wall of said impeller and covering the ports in said section whereby the discharged abrasive will be directed through certain of the uncovered discharge ports in said impeller, a normally stationary supporting plate positioned exterior to said impeller and having an aperture through which the discharge end of said feed pipe extends, and means associated with said supporting plate and said deflector plate for adjustably securing said deflector plate to said supporting plate.

7. A centrifugal abrasive blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, a tubular impeller positioned within said central space fixed to rotate with said rotor and operative to retain abrasive therein for a sufficient interval to transmit to the abrasive a centrifugal speed corresponding to the speed of rotation of the impeller, said impeller having a plurality of spaced abrasive discharge ports in the tubular side wall thereof equal in number to the number of blades carried by said rotor, said ports being relatively short in peripheral extent and positioned slightly in advance of their corresponding blades, a feed spout for conducting abrasive into said tubular impeller, and an arcuate shaped deflector section extending into said impeller and covering a limited arcuate ported section of the tubular side wall of said impeller whereby the discharged abrasive will be directed through certain of the uncovered discharge ports in said impeller.

8. A centrifugal abrasive blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, a tubular impeller positioned within said central space and having a tubular side wall and a closed rear end wall fixed to said rotor head to rotate therewith and operative to retain abrasive therein for a sufficient interval to transmit to the abrasive a centrifugal speed corresponding to the speed of rotation of the impeller, said impeller having a plurality of spaced abrasive discharge ports in the tubular side wall thereof, a feed spout for conducting abrasive into said tubular impeller, an arcuate shaped deflector plate extending into

said impeller and overlapping a limited arcuate section of the tubular side wall of said impeller and covering the ports in said section whereby the discharged abrasive will be directed through certain of the uncovered discharge ports in said impeller, a normally stationary supporting plate positioned exterior to said impeller and having an opening through which the discharge end of said feed pipe extends, and means associated with said supporting plate and said deflector plate for adjustably securing said deflector plate to said supporting plate.

9. A centrifugal blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, an impeller positioned within said central space fixed to rotate with said rotor and operative to retain abrasive therein for a sufficient interval to transmit to the abrasive a centrifugal speed corresponding to the speed of rotation of the impeller, said impeller having a tubular side wall comprising a generally tapered side wall portion and a generally cylindrical side wall portion adjacent the inner ends of said blades, said cylindrical portion having a plurality of spaced abrasive discharge ports therein, and a normally stationary control device having an arcuate shaped side wall portion extending into said central space and covering certain of the ports in said section, said control device being operable to direct the abrasive through certain of the uncovered discharge ports of said impeller and into the path of rotation of the inner ends of said blades during a predetermined limited arc of rotation thereof.

10. A centrifugal blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, an impeller positioned within said central space fixed to rotate with said rotor and operative to retain abrasive therein for a sufficient interval to transmit to the abrasive a centrifugal speed corresponding to the speed of rotation of the impeller, said impeller having a tubular side wall comprising a generally tapered side wall portion and a generally cylindrical side wall portion adjacent the inner ends of said blades, said cylindrical portion having a plurality of spaced abrasive discharge ports therein, and an arcuate shaped deflector plate extending into said central space and interiorly covering a limited arcuate ported section of the tubular side wall of said impeller whereby the discharged abrasive will be directed through certain of the uncovered discharge ports in said impeller.

11. A centrifugal blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, an impeller positioned within said central space fixed to rotate with said rotor and operative to retain abrasive therein for a sufficient interval to transmit to the abrasive a centrifugal speed corresponding to the speed of rotation of the impeller, said impeller having a tubular side wall comprising a generally tapered side wall portion and a generally cylindrical side wall portion adjacent the inner ends of said blades, said cylindrical portion having a plurality of spaced abrasive discharge ports therein, deflecting elements fixed to the interior of said tapered side wall portion for guiding the abrasive to the discharge ports thereof, and a normally stationary control device having an arcuate shaped side wall portion extending into said impeller and covering a limited number of the ports in said impeller, said control device being operable to direct the abrasive through certain of the uncovered ports of said impeller and into the path of rotation of the inner ends of said blades during a predetermined limited arc of rotation thereof.

12. A centrifugal blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, a generally tubular shaped impeller having a closed end wall and a tubular side wall positioned within said central space fixed to rotate with said rotor and operative to retain abrasive therein for a sufficient interval to transmit to the abrasive a centrifugal speed corresponding to the speed of rotation of the impeller, said impeller having a plurality of spaced abrasive discharge ports in the tubular side wall thereof equal in number to the number of blades carried by said rotor, an abrasive supply spout for conducting abrasive into said tubular impeller, a spiralling rib extending around the inner end of said feed spout for deflecting the abrasive for discharge substantially through the full axial width of said discharge ports, and a normally stationary control device comprising a baffle plate extending into and covering a limited number of the ports in said impeller operable to direct the abrasive through certain of the uncovered ports of said impeller and into the path of rotation of the inner ends of said blades during a predetermined limited arc of rotation thereof.

13. A centrifugal blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, a generally tubular shaped impeller having a closed end wall and a tubular side wall positioned within said central space fixed to rotate with said rotor and operative to retain abrasive therein for a sufficient interval to transmit to the abrasive a centrifugal speed corresponding to the speed of rotation of the impeller, said impeller having a plurality of spaced abrasive discharge ports in the tubular side wall thereof equal in number to the number of blades carried by said rotor, an abrasive supply spout for conducting abrasive into said tubular impeller, a spiralling rib extending around the inner end of said feed spout

for deflecting the abrasive for discharge substantially through the full axial width of said discharge ports, and an arcuate shaped deflector plate extending into said central space and interiorly around a limited arcuate ported section of the tubular side wall of said impeller whereby the discharged abrasive will be directed through certain of the uncovered discharge ports in said impeller.

14. A centrifugal blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, a generally tubular shaped impeller having a closed end wall and a tubular side wall positioned within said central space fixed to rotate with said rotor and operative to retain abrasive therein for a sufficient interval to transmit to the abrasive a centrifugal speed corresponding to the speed of rotation of the impeller, said impeller having a plurality of spaced abrasive discharge ports in the tubular side wall thereof, an abrasive supply spout for conducting abrasive into said tubular impeller, a spiralling rib having a tapering periphery extending around the inner end of said feed spout for deflecting the abrasive for discharge substantially through the full axial width of said discharge ports, and a control device having an arcuate shaped deflector section extending into said impeller and overlapping a limited arcuate ported section of the tubular side wall of said impeller whereby the discharged abrasive will be directed through certain of the uncovered discharge ports in said impeller.

15. A centrifugal abrasive blasting machine operable to throw a concentrated stream of abrasive over a predetermined limited arc including in combination, a rotor head mounted for high speed rotation having a plurality of spaced radially extending abrasive throwing blades supported thereby, the inner ends of said blades extending inwardly short of the axis of rotation of the rotor to provide a central space, a tubular impeller positioned within said central space and having a tubular side wall and a closed rear end wall fixed to said rotor head to rotate therewith, said impeller having a plurality of spaced abrasive discharge ports in the tubular side wall thereof, an abrasive supply spout for conducting abrasive into said tubular impeller, and a normally stationary abrasive control device having an arcuate shaped wall portion extending into said impeller and overlapping a limited arcuate section of the tubular side wall of said impeller and covering the ports in said section, said control device having means operable to direct the abrasive through certain of the uncovered ports of said impeller and into the path of rotation of the inner ends of said blades during a predetermined limited arc of rotation thereof.

CHESTER E. UNGER.