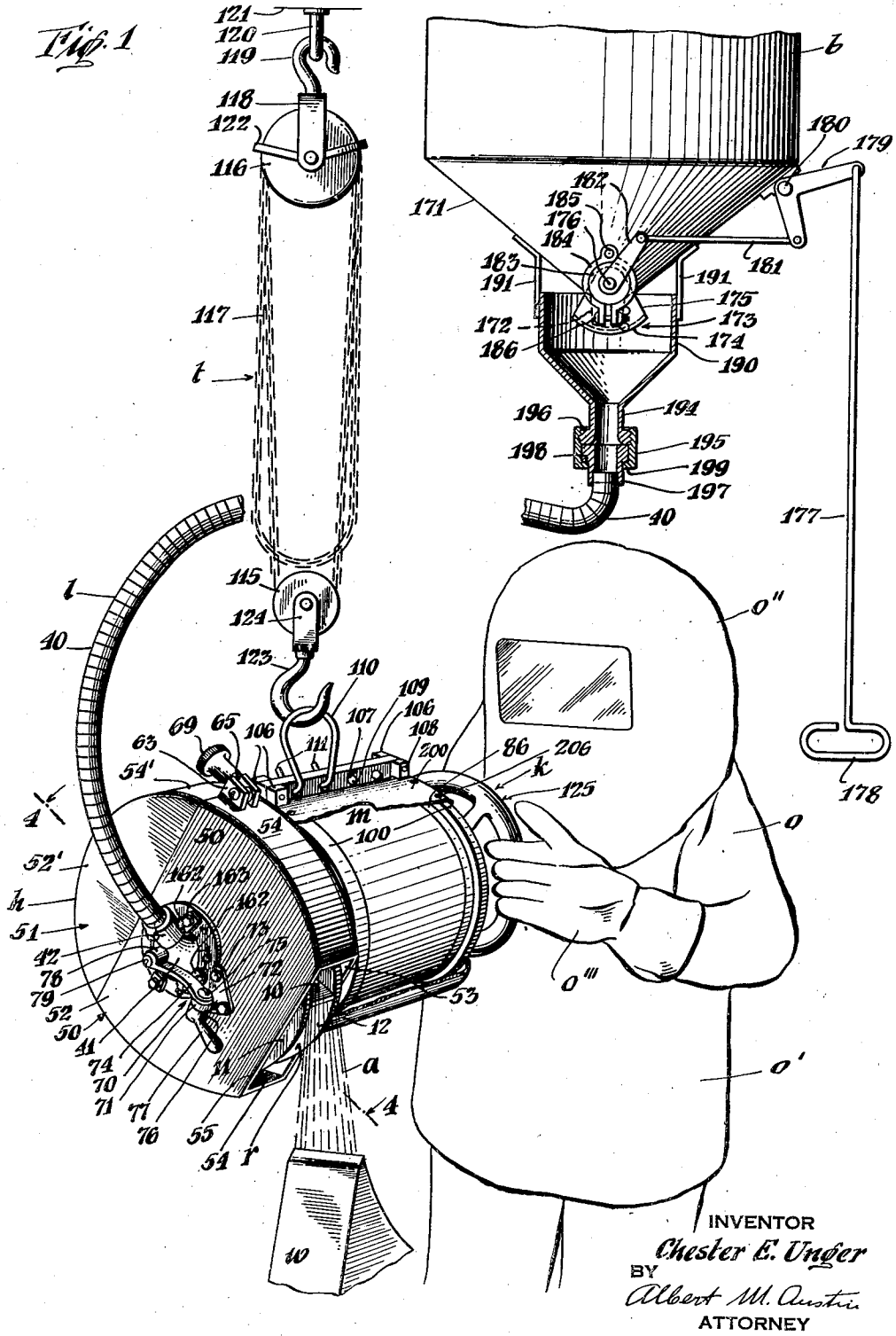
Nov. 18, 1941. C. E. UNGER 2,263,321

CENTRIFUGAL BLASTING MACHINE

Filed June 1, 1940 4 Sheets-Sheet 1

Fig. 1

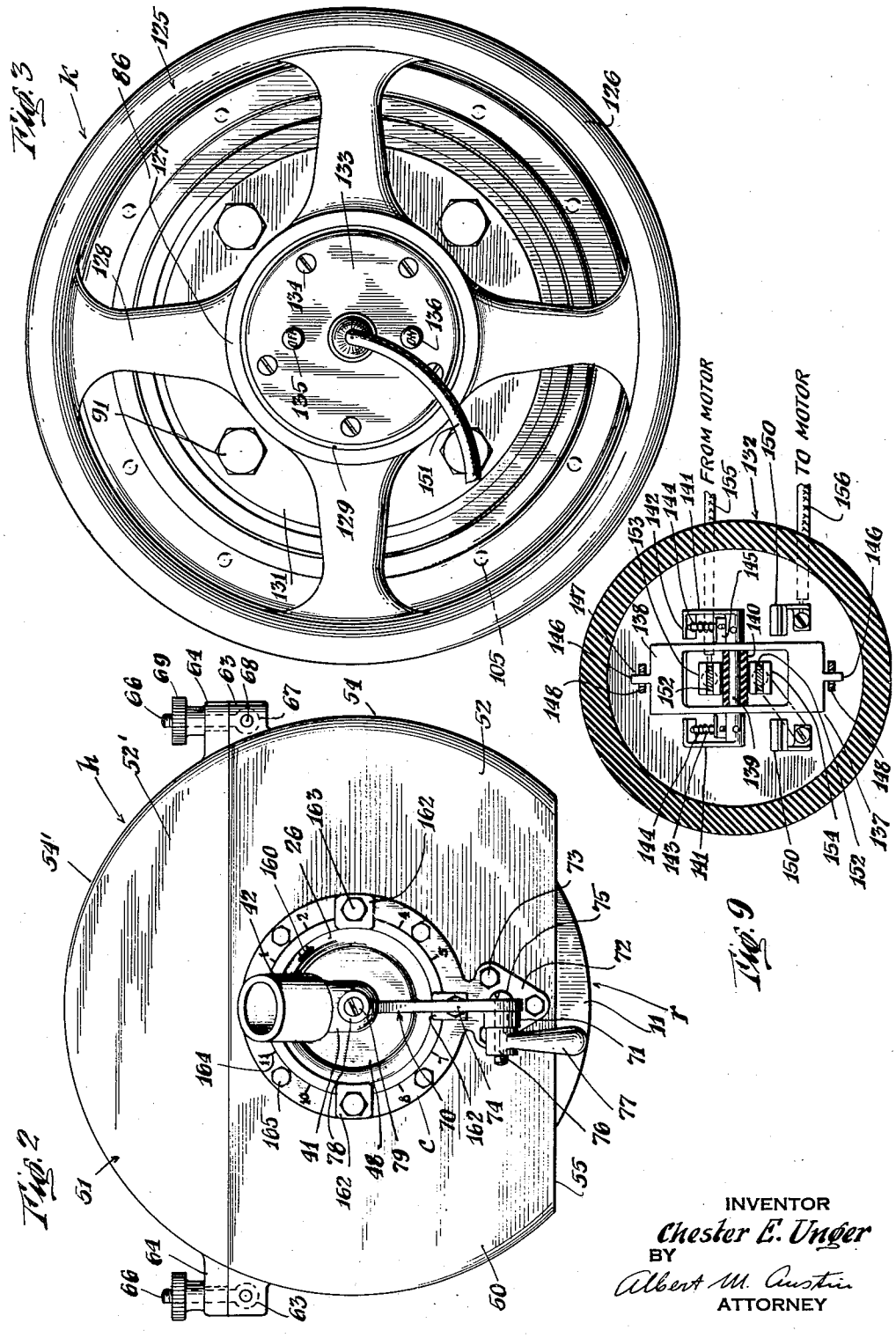


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CENTRIFUGAL BLASTING MACHINE

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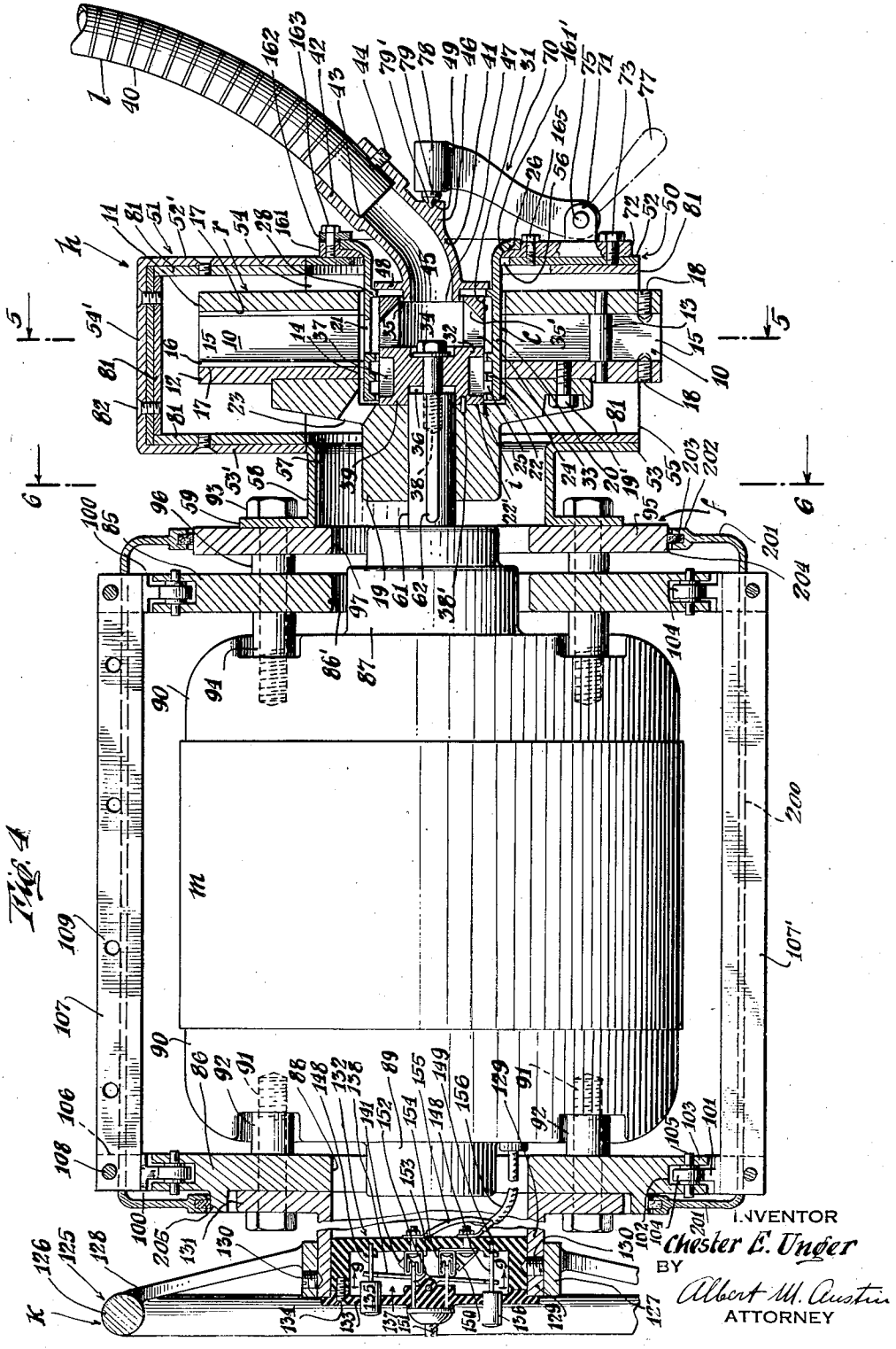


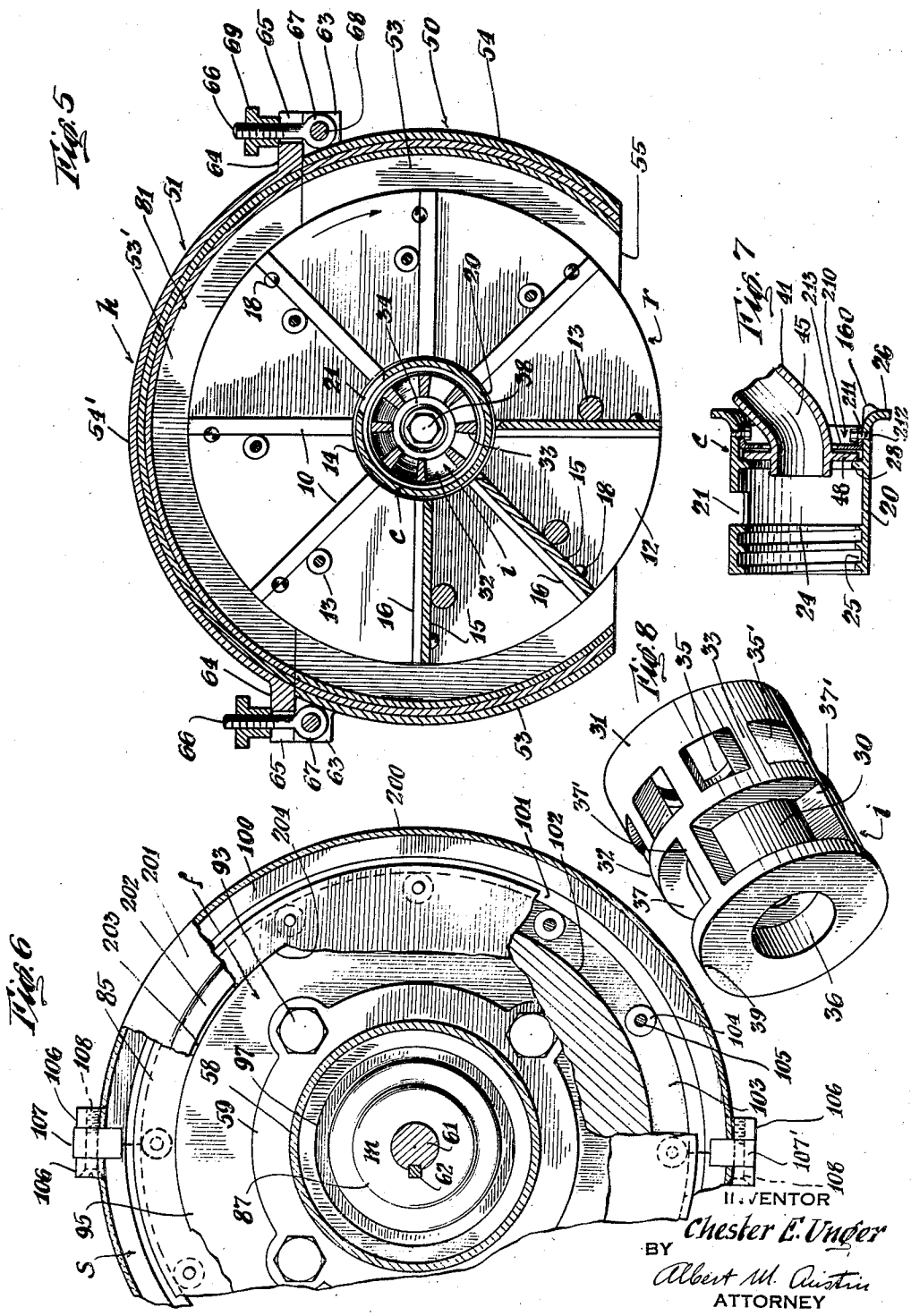
Fig. 4

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CENTRIFUGAL BLASTING MACHINE

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Patented Nov. 18, 1941 2,263,321

UNITED STATES PATENT OFFICE

2,263,321

CENTRIFUGAL BLASTING MACHINE

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Application June 1, 1940, Serial No. 338,294

14 Claims. (Cl. 51—9)

This invention relates to a centrifugal blasting machine, and more particularly to a centrifugal blasting unit which may be manipulated by the operator to bring the stream of abrasive fired thereby into abrading contact with the surfaces of the workpiece to be cleaned.

While centrifugal abrasive throwing wheels are generally known and in general use, such wheels have generally been mounted on a platform or support in such manner that the operator has no control over the direction of the blast during operation. With such units conveyors have been provided to carry the work into the fan-shaped stream from the abrasive throwing wheel and the operator has been unable to shift at will the direction of the fired stream of abrasive over the surfaces of the workpiece. While economics in operation and speed of cleaning attained by centrifugal blasting wheels over the air blast gun are generally known and recognized in the art, no centrifugal blasting unit has heretofore been provided which could be conveniently manipulated by hand so as to direct the fired abrasive against any desired selected surface of the workpiece to be cleaned. Large, massive and irregular castings and forgings have therefore been heretofore cleaned by hand-manipulated air blast guns.

An object of this invention is to provide a practical centrifugal blasting unit designed to permit convenient movement and manipulation thereof over, under and around the surfaces of large or intricate castings, forgings, bars or sheets which have heretofore been cleaned and treated by air blast guns.

Another object of this invention is to provide a portable centrifugal blasting unit which is suitably housed to protect the operator but which can be easily and conveniently manipulated by the operator over, under and around the workpiece.

Another object of this invention is to provide a portable centrifugal blasting unit which is admirably adapted for blast room use.

Still another object of this invention is to provide a centrifugal blasting unit which is sturdy and strong in construction, which requires a minimum of horsepower to operate, which is constructed to provide a minimum of power loss in transmission, and which has means for adjusting and shifting the directional control means associated with the centrifugal rotor during operation by an operator who may observe the progress of the blasting operation at a safe distance from the abrasive blast.

Other objects of this invention will become apparent as the disclosure proceeds.

In accordance with this invention, a bladed centrifugal blasting wheel or rotor is fixed directly to the shaft of a driving motor so as to reduce power transmission losses to a minimum. The abrasive throwing wheel is partially enclosed in a guard housing having an opening through which the abrasive fired by the wheel may escape without impediment. A suitable sling or carriage extending around a framework fixed to the exterior shell of the motor provides means by which the unit as a whole may be flexibly suspended from an overhead suspension device or supported by a suitable floor or wall pedestal or bracket. The directional control device, such as the tubular control cage positioned within the central part of the rotor, is adjustably fixed to the guard housing which partially encloses the wheel. A hand manipulating means, such as a hand wheel, is connected to one end of the motor supporting framework at a point removed from the abrasive throwing rotor. The guard housing for the wheel is connected to the opposite end of the motor supporting framework. The unit is so constructed that by manipulating or turning the hand wheel, the framework, motor shell, and guard housing may be rotated to any desired clockdial position within the supporting carriage or suspension means so as to swing the discharge opening in the guard housing into any desired clockdial position to best direct the fired abrasive against the workpiece under treatment. Such shifting movement of the discharge opening in the housing will likewise shift the control device which is attached to the guard housing so that the proper desired discharging relationship between the control device and the opening in the guard housing will be uniformly maintained. Means are provided for initially adjusting the discharge port in the control device so as to place it in proper clockdial position with respect to the discharge opening in the guard housing.

By the provision of supporting means for the unit, such as a suspension device, the whole unit may be swung around in a circle and over an area which is limited only by the nature of the supporting device, by the operator who exerts a slight pushing or pulling force on the hand wheel which also controls the direction of blast. Where an overhead suspension means is used, a simple block and tackle suspension means may be provided, the upper end of which is connected to a fixed frame or a movable frame or boom arm. Abrasive is fed to the rotor from an overhead

abrasive supply bin by a flexible abrasive supply conduit which does not interfere with the shifting movement of the unit. Suitable electrical control means, such as push buttom or other switch devices, may be conveniently located on or adjacent to the manipulating handle for controlling the operation of the driving motor. The hand wheel may be connected to the motor framework by means of a connecting neck or shank of any desired length so that the operator can position himself at a convenient, safe distance from the abrasive blast fired by the rotor. This connecting neck or shank may be made of tubular pipe within which the motor wires, circuits and switches may be protectively contained. The operator may station himself within the blasting room or outside of the blasting room, and in the latter case one wall of the blasting room is provided with suitable flexible curtains through which the neck portion of the unit may extend so that the hand wheel can be manipulated from a point entirely exterior to the blasting room.

The centrifugal abrasive throwing rotor comprising part of this portable blasting unit, may be made in diameters of from six inches to twenty inches or more, with a blade width varying from one-half inch to three inches or more. The driving motor is driven at an R. P. M. of such a nature that abrasive fired by the rotor will impinge the workpieces at blasting velocities. In other words, the motor should drive the rotor at a speed which will produce a linear velocity at the periphery of the blasting rotor of from eight to twelve thousand linear feet per minute. For example, if the rotor is eight inches in diameter, a motor of from three to four thousand R. P. M. should be selected. While a variable speed motor may be employed, in the usual installation a constant speed motor will be used of sufficient R. P. M. to drive the attached abrasive throwing rotor at the desired peripheral speed.

An abrasive throwing wheel of eight inches in diameter, for example, is capable of throwing from twenty to fifty pounds of abrasive per minute when driven by a one-horsepower motor. This compares with a blast gun throwing an equivalent amount of abrasive using compressed air requiring from fifteen to thirty horsepower to produce. Substantial operating economies over the compressed air system are attained by this unit and, in addition, it can be manipulated as desired by the operator with a minimum of effort to uniformly blast and clean intricate castings and workpieces with the blasting operation under constant control and observation of the operator. A longfelt need for a practical, commercial, portable centrifugal blasting unit which has substantially all the flexible features of the air blast gun, with the accompanying advantages of faster and more thorough blast cleaning of intricate workpieces and substantial savings in operating costs, is admirably supplied by the centrifugal blasting unit herein disclosed.

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 perspective view of the portable centrifugal blasting unit shown swingably suspended from an overhead support and guided by an operator;

Fig. 2 is a front elevational view of the wheel housing and a portion of the abrasive supply line;

Fig. 3 is an enlarged elevational view of the hand wheel used by the operator to manipulate the unit;

Fig. 4 is an enlarged longitudinal cross-sectional view through the unit as it appears when looking in the direction of the arrows **4—4** of Fig. 1;

Fig. 5 is a cross-sectional view through the abrasive throwing wheel or rotor and its guard housing as it appears when looking in the direction of the arrows **5—5** of Fig. 4;

Fig. 6 is another cross-sectional view through the unit as it appears when looking in the direction of the arrows **6—6** of Fig. 4, certain parts being broken away to illustrate certain structural details;

Fig. 7 is a cross-sectional view through the tubular control cage which may be used to control the direction of blast from the wheel;

Fig. 8 is a perspective view of the impeller which is positioned within the tubular control cage and secured to rotate with the wheel; and

Fig. 9 is an enlarged view of the motor control switch positioned within the switch box at the center of the unit manipulating hand wheel.

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

Referring to the drawings, the centrifugal projector therein disclosed comprises generally a bladed abrasive throwing wheel or rotor *r*, which is fixed to the shaft of a driving motor *m*. Abrasive in the desired quantities is supplied to the rotating abrasive throwing wheel through an abrasive supply line *l*, which conducts the abrasive into the central part of the rotor where means are provided for controlling the direction of discharge of the abrasive fired from the rapidly rotating wheel. Such directional control means may comprise a tubular control cage *c* which extends into the central space within the rotor and which is adjustably secured to the wheel housing *h*. The abrasive conducted into the tubular control member *c* by the abrasive supply line *l* is driven out through a discharge port in the tubular side wall of the control cage and into the path of rotation of the blades of the wheel by an impeller *i* which is suitably fixed to the wheel to rotate therewith. The abrasive throwing wheel *r*, tubular control cage *c* and impeller *i* may be constructed similarly to that shown in my United States Patent No. 2,162,139, issued June 13, 1939.

The wheel housing *h* is fixed to a framework *f* attached to the shell or casing of the driving motor *m*. This framework is supported in a sling device *s* from which the portable unit may be suspended or supported. A suitable manipulating handle *k* is attached to the framework *f* and is preferably spaced a safe operating distance from the abrasive throwing wheel *r*. Suitable push buttons or switch controls are carried by or positioned adjacent the manipulating handle *k* for starting and stopping the

motor or regulating the speed thereof. An overhead abrasive supply bin *b*, with means for controlling the flow of abrasive through the feed line *l* into the wheel, is conveniently positioned adjacent the operator.

Where the unit is suspended from a block and tackle device *t*, as shown in Fig. 1, the operator can push the wheel laterally to either side or toward him or away from him to bring the wheel adjacent the workpiece *w*. The controlled blast fired from the wheel may be directed against the desired surface area of the workpiece *w* by rotating the manipulating handle *k* which in turn rotates the framework *f* in its supporting sling *s* so as to place the discharge outlet of the wheel housing *h* adjacent the desired surface area of the workpiece. This manipulation will automatically adjust the discharge opening in the control cage *c* which is attached to the housing *h* so that the directed blast from the wheel will always discharge out through the outlet in the wheel housing *h*, irrespective of the clockdial position into which the discharge outlet in the housing *h* is rotated.

The abrasive throwing wheel or rotor *r* may comprise a pair of spaced generally parallel extending side wall forming discs **11** and **12** which are held in spaced position by suitable spacing studs **13**. A plurality of radially arranged abrasive throwing blades **10**, formed of wear resistant metal, are positioned between and supported by spaced side wall discs **11** and **12**, the blades **10** extending inwardly short of the axis of rotation of the rotor to define a central space. The side wall discs **11** and **12** have each a circular opening **14** in the center thereof to further define the circular central space within the rotor, the peripheral edges of the central openings **14** being substantially in alignment with the inner ends of the blades **10**.

Each of the blades **10** comprises a relatively flat bottom wall **15** and substantially parallel extending flanged side walls **16** which seat within paired grooves **17** provided in the side wall discs **11** and **12**. Each of the blades **10** is removably secured to the side wall discs **11** and **12** by set screws **18** which extend through threaded openings in the side wall discs **11** and **12** and engage the adjacent side edges of the blades. The blades can thus be removed through the periphery of the wheel when worn and new blades inserted. The rotor *r* is fixedly secured to the shaft **61** of the motor *m* by means of a hub **19** secured to the shaft by suitable spline **62**, the hub **19** being bolted to the side wall disc **12** as by bolts **19'**.

The tubular control cage *c*, as shown more particularly in Figs. 4, 5 and 7, formed as a one-piece casting or forging of wear resistant metal, has a tubular side wall **20** which extends into the central space within the rotor *r*. A discharge port **21** is provided in the tubular side wall **20** of the control cage. The discharge port **21** is so shaped that the side edges thereof are normally positioned between the flanged side edges **16** of the blades **10**. The peripheral length of the discharge port **21** determines the spread or length of arc of abrasive discharged from the bladed rotor *r*, and it will be appreciated that the peripheral length of the discharge port **21** may be made to suit operating requirements. Usually it is desired to concentrate the abrasive discharged from the rotor over a relatively limited arc and the peripheral length of the discharge port **21** would be accordingly reduced. The inner end of the tubular control member *c* extends into a circular cavity or pocket **22** in the hub **19**, the hub being provided with equally spaced air admission portholes or passages **23** which communicate with the pocket **22**, which serve to reduce the effect of disturbing air currents within the wheel whereby a more uniform flow of abrasive through the discharge port **21** is obtained.

The interior surface of the tubular wall **20** of the control cage *c* is provided with a spiralling rib **24** which extends from the rear end of the control cage up to the adjacent side edge of the discharge port **21**. The rib **24** defines a spiralling passage **25** along which any stray abrasive which has worked its way rearwardly of the discharge ports **21** may be driven forwardly by the fan action of the impeller *i* to place this stray abrasive into position to be discharged by the impeller *i* out through the discharge port **21**. The outer end of the tubular wall **20** of the control cage terminates in an outurned flange **26** which provides a means by which the control cage can be secured to the rotor housing *h*. A circular flange or lip portion **28** is formed integral with the inside surface of the tubular wall **20** of the control cage which cooperates with a flange **48** associated with feed line *l* to provide a seal which prevents escape of abrasive from the front end of the control cage. The flange **28** is spaced forwardly of the discharge port **21** so as not to interfere with the proper operation of the impeller *i*.

The impeller *i*, as shown in Figs. 4, 5 and 8, is positioned within the control cage *c* and may be made from a one-piece casting or forging of wear resistant metal. It is provided with a shank or neck portion **30** having a foot portion **39** which seats against the bottom **22'** of the hub pocket **22**. The impeller further comprises a circular front wall **31** and a circular rear wall **32** between which is positioned a plurality of equally spaced impeller vanes **33** which are equal in number to the throwing blades **10** of the rotor and which may extend inwardly short of the axis of rotation of the rotor to define a central abrasive admitting space **34**. The circular front wall **31** of the impeller may be provided with a central opening **35** through which the abrasive is admitted, and this front wall may also be provided with an inclined inside wall surface **35'** to more effectively guide and direct the abrasive through the discharge port **21** of the control cage *c*. The shank portion **30** of the impeller *i* may be provided with a circular recess **36** into which the end of the motor shaft **61** projects, the impeller being fixedly secured to the end of the motor shaft **61** by a sturdy threaded bolt **38** which extends through shank portion **30** of the impeller and screws into a threaded hole in the end of the motor shaft **61**.

Each of the impeller vanes **33**, as shown in Fig. 5, should be so set that the throwing face thereof is slightly forward of the advancing face of the corresponding blade **10** of the rotor, so that each vane will discharge its load of abrasive uniformly onto the inner end of its corresponding blade with the least possible obstruction as the blade passes over the discharge port **21** of the control cage. To assure that the vanes **33** of the impeller *i* are fixedly held in the proper advance position with respect to the blades **10** of the wheel, a stud **38'** which extends into the foot portion **39** of the impeller and into a suitable aperture in the bottom wall **22'** of the hub **19**,

is provided. A circular cavity 37 extends around the shank portion 30 of the impeller between the rear wall 32 and the foot portion 39. The circular cavity 37 may be interrupted by one or more transversely extending ribs 37' which serve as a fan to drive stray abrasive along the spiral passage 25 of the control cage forwardly into port discharging position. The construction of the abrasive throwing rotor *r* including the apertured hub 19, the control cage *c* and impeller *i*, is described in detail in my United States Patent No. 2,162,139.

The abrasive supply line *l* comprises a section of flexible tubing 40 whose upper end is detachably connected to an abrasive supply funnel 199 fixedly suspended under the discharge spout 172 of an abrasive supply bin *b*. The lower end of the flexible tubing is inserted into the enlarged boss 42 of an abrasive feed spout 41. The boss portion 42 is provided with an inturned shoulder 43 against which the inner end of the flexible conduit 40 abuts. A set screw 44 threaded into the side wall of the boss portion 42 frictionally engages the side wall of the flexible conduit 40 to hold the same in position. The internal bore 45 of the feed spout 41 and the flexible conduit 40 presents smooth and uniform wall surfaces so that the abrasive can flow therethrough with minimum friction. The outturned flange 48 adjacent the discharge end 47 of the feed spout is arranged to abut against the outside surface of the circular rib or flange 28 of the control cage to prevent leakage of abrasive out through the front end of the control cage. The inner end 47 of the feed spout 41 may terminate just outside of or in the center opening 35 in the front wall 31 of the impeller *i*, so that the abrasive will be discharged into the central space 34 within the impeller and fall into the path of rotation of the impeller vanes 33. In one form of the invention, the underside of the feed spout 41 may be provided with a boss 46 which has an external cavity 49 which receives an element of a device 70 for holding the discharge end of the feed spout in proper discharging position.

As shown more particularly in Figs. 1, 2, 4 and 5, the abrasive throwing rotor *r*, control cage *c*, impeller *i*, a portion of the hub 19 and a portion of the feed spout 41, are contained within a housing *h* comprising a body section 50 and a cover section 51, both sections being formed of steel plate shaped to the required contour. The body section 50 comprises a front wall 52, a rear wall 53, and generally arcuate shaped side walls 54 which may be generally circular in contour but otherwise spaced from the wheel periphery. The front wall 52, rear wall 53 and side walls 54 are cut off at their lower ends to define a discharge opening 55 which is of sufficient size to permit the free ejection of the directed stream of abrasive thrown by the wheel therethrough. The front wall 52 is provided with a circular shaped opening 56 through which the front end of the control cage *c* projects. The rear wall 53 of the body section is also provided with a circular opening 57 through which a portion of the hub 19 of the rotor *r* projects. The opening 57 is surrounded by a tubular collar portion 58 which terminates in an outturned flange 59 by means of which the housing is secured to the framework *f*.

The cover section of the housing comprises generally a front wall portion 52' coplanar with the front wall portion 52 of the body section, a rear wall portion 53' coplanar with the rear wall portion 53 of the body section, and a generally arcuate shaped top wall 54' which forms in effect a curved extension of the side walls 54 of the body section. The lower edges of the front wall portion 52' and rear wall portion 53' and the lower edges of the curved top wall portion 54' of the cover section are so shaped and constructed that when the cover section is in closed position, a stream-lined fit with the top edge of the front wall portion 52, the top edge of the rear wall portion 53 and the top edge of the side wall portions 54 of the body section, is obtained.

Suitable means are provided for locking the cover section 51 to the body section 50. Such means may comprise a pair of spaced lugs 63 projecting laterally from each of the side wall portions 54 of the body section. Each end of the top wall portion 54' of the cover section terminates in an outturned foot portion 64 which seats over the adjacent lug portions 63, as shown more particularly in Figs. 1, 2 and 5. Each foot portion 64 is provided with an open-ended slot 65. A threaded eye-bolt 66 having an eye portion 67 through which a pin 68 extends has a shank portion extending through the open slot 65 in the foot portion 64. The pin 68 extends through openings in the spaced paired lugs 63 with the eye head 67 of the bolt positioned between the paired lugs. A cap nut 69 is threaded down over the threaded shank of the eye-bolt 66. Each cap nut may be manipulated to seat against the adjacent foot portion 64 and draw the cover section 51 to the body section 50 so that they together form an enclosed housing. It will be appreciated that the cover section 51 may be removed by loosening the cap nuts 69 sufficiently to permit the eye-bolts 66 to be swung outwardly. When the cover section 51 is removed the wheel can be readily inspected and the blades 10 removed or replaced as desired.

The device 70 for securing the discharge end of the feed spout 41 in operating position may comprise a lug 71 having a foot portion 72 which may be secured as by threaded bolts 73 to the front wall 52 of the body section 50 of the housing in a position adjacent the opening 56 therein. An arm member 74 is swingably connected to the lug 71 by means of a threaded screw or bolt 75 which extends through aligned apertures in the lower end of the arm 74 and the lug 71. A threaded nut 76 is threaded over the shank of the bolt 75 and may be manipulated by a wing 77 formed as an integral part of the nut 76. The upper end of the arm 74 carries a cylindrical portion 78 within which is screwed a threaded stud 79 having a cone-shaped end 79' which seats within the cone-shaped cavity 49 provided in the boss 46 of the feed spout 41. By manipulating the wing 77 of nut 76, the nut can be loosened so as to permit downward swinging movement of the arm 74 so as to permit the inner end of the feed spout 41 to be withdrawn from the tubular control cage *c*. The control cage *c* and the impeller *i* can then be readily assembled, adjusted, repaired or replaced. When abrasive flow connection is to be made, the discharge end 47 of the feed spout 41 is inserted into the control cage until the laterally extending flange 48 thereon seats against the inwardly extending rib 28 on the control cage. The arm 74 is then swung upwardly, the cone-shaped end 79' thereof pressed into seating engagement with the cone-shaped cavity 49 in the boss 46 of the feed spout 41, and the nut 76 then manipulated by turning the wing

77 so as to frictionally secure the arm 74 in operating position.

To protect the enclosing walls 52, 53 and 54 of the body section 50 and walls 52', 53' and 54' of the cover section 51 of the housing *h* from damage due to possible stray blast, these walls are suitably lined on their inner surfaces with wear resistant metal plates 81 which are shaped to the contour of the surface which they are to cover and are secured in position as by suitable metal screws 82. The abrasive throwing rotor *r* equipped with a control cage *c* and impeller *i* of the type herein illustrated and described, results in a minimum of misdirected stray abrasive.

The supporting framework *f* comprises a pair of heavy spaced metal disc-shaped plates 85 and 86, between which the wheel driving motor *m* is positioned. The front disc-shaped plate 85 is provided with a central aperture 86' through which the bearing portion 87 of the motor may extend. The disc-shaped plate 86 may likewise be provided with a central opening 88 through which the bearing portion 89 of the front end of the motor may extend. Bearing portions 87 and 89 rotatably support the motor shaft 61. The motor *m* has not been illustrated in detail since any well known make of motor known to the art may be used. Either a constant or variable speed motor may be selected, but preferably a constant speed motor is employed. The frame disc 86 may be suitably bolted to the motor casing 90 by a plurality of spaced threaded bolts 91 whose ends are threaded into the motor casing 90. Each bolt 91 may extend through a tubular collar 92, which collars maintain the proper spaced relationshop between the supporting disc 86 and motor casing 90. The supporting disc 85 may likewise be secured to the motor casing 90 by spaced bolts 93, the disc 85 being maintained in proper spaced relationship from the motor casing 90 by tubular collars 94 which surround a portion of the bolt shank.

The rear wall 53 of the wheel housing merges into a contracted tubular neck portion 58 which provides a housing for a portion of the wheel hub 19 and motor shaft 61. The wheel housing *h* may be secured to the frame *f* by the bolts 93 which extend through openings in an outturned flange portion 59 extending from the end of the tubular neck portion 58. The outturned flange portion 59 seats against a circular spacer plate 95 having holes through which the bolts 93 extend, the spacer plate 95 being spaced from the frame disc 85 by tubular collars 96 through which the bolts 93 extend. Spacer plate 95 may be provided with an opening 97 through which the front bearing 87 of the motor extends. The spacer plate 95 and collars 96, could, of course, be done away with by lengthening the tubular neck portion 58 of the housing so that the flange portion 59 thereof would seat against the outside face of the supporting disc 85. It is important that the housing *h* be rigidly but removably secured to the framework *f* without in any way interfering with the free rotation of the rotor *r* and motor shaft 61, but it is appreciated that numerous different types of securing arrangements may be provided within the purview of this invention.

The unit may be supported in a suitable sling *s* which comprises a pair of straps 100 of sturdy construction which are generally circular in form and each provided with a track 101. Each of the supporting discs 85 and 86 is provided with a peripheral groove 102 each of which defines a pair of spaced peripheral flanges 103. A series of spaced rollers 104 each rotatably mounted on a pin 105 are arranged to roll over the normally stationary circular track 101. Each pin 105 projects through the flanges 103 of the supporting disc so as to permit free rotative movement of the rollers 104 thereon. The spaced flanges 103 are designed to overlap the adjacent sides of the track 101 to maintain the rollers 104 on the track 101.

For convenience in assembly, each of the circular shaped straps 100 may be formed in two half sections, as shown in Fig. 6. Each half section is provided with a foot portion 106 extending laterally from each end thereof. Between adjacent paired foot portions 106 at one side of the motor a lift bar 107 extends which is secured to the foot portions 106 by a suitable threaded bolt or screw 108 which also holds the adjacent ends of the sections in abutting track formation. A stiffening bar 107' may be positioned between the foot portions 106 opposite the lift bar 107 and may be connected to adjacent foot portions 106 by a similar securing screw 108. It will be appreciated that when the two half sections of each circular strap are connected as by screws 108, a generally circular track 101 upon which the rollers 104 may roll is provided. The lift bar 107 may be provided with a plurality of spaced holes 109 into which the hooked ends 111 of the metal lifting loop 110 may be inserted into any selected pair of openings 109 which are nearest the center of gravity of the unit when in operation.

The unit may be suspended from the lift loop 110 by any suitable lift device *t*. There is shown in Fig. 1 a block and tackle arrangement which may be used for this purpose, which comprises a lower pulley 115 which is connected to an upper pulley 116 by a chain 117. The upper pulley is provided with the usual clevis 118 having a swivel hook 119 hooked into an eye-bolt 120 secured to a fixed or movable frame support 121. The upper pulley 116 is provided with a convenient locking dog 122 which holds the chain 117 fixed in any desired position. The lower pulley 115 carries a clevis 124 provided with a swiveled hook 123 which hooks into the lifting loop 110. Thus with such a block and tackle arrangement the blasting unit may be raised and lowered or swung into various angular positions limited only by the length of the block and tackle suspension *t*. It is appreciated that other unit supporting means operably connected to the unit supporting straps 100 may be used, such as various suspension devices connected to a fixed or movable frame.

The abrasive throwing wheel housing *h* and associated control cage *c* may be manipulated so as to direct the discharged abrasive into substantially any desired clockdial direction. Such manipulating means, as shown in Figs. 1, 3 and 4, may comprise a hand wheel 125 provided with the usual rim 126 connected to a collar 127 by spokes 128. The collar 127 is connected to a hollow tubing 129 as by set screws 130. The tubing 129 is provided with an outwardly flared flange 131 which may be bolted as by the bolts 91 to the supporting disc 86 of the framework *f*. The tubing 129 may be of any desired length, from a few inches to several feet, and provides a means for firmly connecting the hand wheel 125 to the rotatably mounted supporting disc at any desired convenient distance from the abrasive throwing wheel *r*.

The tubing 129 provides a convenient housing

for a switch box 132 positioned within the end thereof, having a cover panel 133 removably secured to the switch box as by screws 134. The switch box and cover panel may be made of suitable insulating material, such as hard rubber or phenolic resin. The cover panel 133, as shown in Figs. 3, 4 and 9, has a push button 135 for throwing the motor out of operation and a push button 136 for throwing the motor into operation, these buttons being operably connected to a suitable snap switch 137 contained within switch box 132. This switch may be of any standard make, such as that illustrated in the drawings, comprising a rocker plate 138 pivotally mounted upon a shaft 139 which extends through an insulated boss 140 provided on the interior of the cover panel 133. Rocker elements 141 fixed to the ends of the shaft 139 are each provided with a foot portion 142 having a projecting pin 143 surrounded by a spring coil 144. The upper end of each pin 143 extends through a hole in a bracket element 145 attached to the rocker plate 138. The rocker plate 138 is provided with a tongue projection 146 extending from each end thereof, which extends loosely through an elongated slot 147 in a leg 148 attached to each of the push buttons 135 and 136. The lower end of each leg 148 is adapted to reciprocate in a slot or recess 149 provided in the bottom wall of the switch box 132.

Thus, when the start push button 136 is pushed in, the switch plate 138 is rocked about the shaft 139 so that the laterally extending brackets 145 connected to the rocker plate 138 swing the pins 143 to a point where the coil springs 144 further swing the foot portions 142 into electrical contact with the switch contact element 150. The power line 151 carrying the contact prongs 152 plug into the contact receivers 153 and 154. Contact receiver 153 is electrically connected to one of the lead wires 155 leading to the motor. Contact receiver 154 is electrically connected to the other motor lead wire 156, so that when the foot portions 142 of the snap switch are in electrical contact with the contact element 150 the circuit to the motor is closed and the motor thrown into operation. When switch button 135 is pressed, the switch plate 138 is pivoted so as to swing the foot portions 142 out of electrical contact with contact element 150 so as to open the motor circuit and halt the motor. It will be appreciated that other forms of standard switches may also be used for the purpose.

It will be noted that the power line 151 carrying the contact terminals 152 is positioned substantially concentric of the axis of rotation of the motor so that the discharge opening 55 of the rotor housing can be swung into substantially any clockdial position without interference from the power line. It will also be noted that the switch box 132 containing the snap switch and the motor wiring is all positioned within the tubular member 129 and thus completely housed and protected from damage. It will be appreciated that a generally circular metal shield 200 may be attached to or supported by the circular hangers 100 as by screws 206 to further protect the motor and parts of the machine against possible injury due to flying abrasive. As shown in Figs. 1 and 4, the housing 200 (partially broken away in Fig. 1) may be formed in two half sections, one half section extending between lift bar 107 and the stiffening bar 107' on one side of the motor, and the other half section extending between lift bar 107 and stiffening bar 107' on the other side of the motor. Each half section may be provided with an inturned half circular flange 201 at each side thereof, each flange having a clamp formation 202 thereon within which a felt or rubber sealing gasket 203 may seat. The housing flange 201 positioned adjacent the wheel housing *h* is arranged so that its gasket 203 will bear against the outer periphery 204 of the spacer plate 95. At the opposite end of the motor the frame plate 86 may be provided with a circular boss 205 against which the adjacent sealing gasket 203 may seat. Thus all working parts of the machine may be completely enclosed and protected.

A fixed relationship should be maintained between the clockdial position of the discharge port 21 in the control cage *c* and the discharge opening 55 in the housing *h*, so that the control cage will properly direct the confined stream of abrasive out through the discharge opening 55 and not against the housing walls. The proper clockdial position of the discharge port 21 in the control cage to effect this result in a wheel of given blade length and rotated at a given speed, can be quickly determined by observation and from experience. Generally speaking, the abrasive throwing wheel having a comparative blade length with respect to the wheel diameter, as illustrated in Figs. 4 and 5, should have its discharge port at approximately between the one and two o'clock positions when the center of the discharge opening 55 in the housing is located at approximately the six o'clock position, considering the wheel as rotating clockwise. For convenience in adjustment, the outturned flange 26 of the control cage is provided with a marker 160 which indicates the position of the discharge port 21 in the control cage. The outturned flange overhangs a circular rim 161 adjustably fixed to the front wall 52 of the wheel housing *h* by leveling screws 165. A plurality of cooperating clamp elements 162 overlie the rim member 161 and are in position to clamp the outturned flange 26 of the control cage thereto when the screw bolts 163, one of which extends through a suitable screw opening in each clamp member 162 and into a threaded opening in the rim member 161, are tightened. If clockdial adjustment of the discharge port 21 in the control cage is desirable, the set screws 163 may be loosened and the control cage *c* rotated either clockwise or counterclockwise so as to bring the discharge ports 21 thereof in the desired clockdial position as indicated by the marker 160 thereon. The outer surface of the rim member 161 may be provided with indicating numerals 164, such as appear on the face of a clock, so that the proper setting for the control cage discharge port 21 may be observed and noted. It will be appreciated that the rim member 161 should provide a smooth machined seating surface 161' for the outturned flange 26 of the control cage and that this rim should be leveled so that the longitudinal axis of the control cage is in proper alignment with the axis of rotation of the wheel. This may be easily effected by manipulating the leveling screws 165 which secure the rim member 161 to the front wall 52 of the housing. The foot portion 72, as shown in Fig. 2, may be formed as an integral part of the rim member 161. When the rim member 161 is leveled, proper leveling adjustment of the screws 73 is also made.

The abrasive storage bin *b* may be suitably suspended from some point convenient to the op-

erator *o*. The abrasive bin is provided with a hopper bottom 171 which leads into a suitable spout 172 which may be closed and opened by a suitable pivoted valve 173. The valve 173 is provided with a suitable semi-circular closure wall 174 closely adjacent the open end of the spout 172. A pair of spaced wings 175 extend upwardly from the circular closure portion 174, which are secured to pins 176 pivotally mounted on the feed spout 172. Suitable mechanism is provided for swinging the valve 173 into closed or open position or partially closed or open position, which can be conveniently manipulated by the operator so as to control the flow of abrasive into the flexible feed conduit 40. Such mechanism may comprise a manipulating rod 177 having a convenient handle 178 located adjacent the operator *o*. The rod 177 is connected to one arm of a bell crank 179 pivotally mounted on a suitable bracket 180 fixed to the bottom 171 of the abrasive bin *b*. The other arm of the bell crank 179 is connected to one end of a rod 181 whose other end is connected to a lever 182 fixed to one of the pins 176. Friction means are provided for maintaining the spout valve 173 in any desired adjusted position, which may comprise a brake drum 183 fixed to the pin 176 enclosed within a brake strap 184 fixed as by screw 185 to the bottom wall 171 of the bin. A wing bolt 186 connecting the ends of the brake strap 184 to regulate the friction exerted on the brake drum 183 and consequently the push or pull to be exerted on rod 177 to move the valve 173, is provided. Thus by an upward or downward pull exerted on the control rod 177, the feed valve 173 can be swung into any desired open or closed position to permit the desired quantity of abrasive to be discharged from the feed spout 172.

The abrasive discharging from the feed spout 172 falls into a receiving funnel 190 which is removably connected to the upper end of the flexible feed conduit 40. The funnel 190 is suspended as by strap supports 191 fixed to the bottom 171 of the supply bin *b*. The flexible feed conduit 40 may be detachably connected to the spout portion 194 of the funnel 190 by means of a threaded collar 195 which threads onto a threaded ring 196 fixed to the outer periphery of the spout portion 194. A collar 197 fixed to the upper end of the flexible feed conduit 40 is provided with a circular rib 198 under which an inturned lip 199 provided on the collar 195 seats. By manipulating the collar 195 the flexible feed conduit 40 may be attached to or detached from the spout portion 194 of the supply funnel 190.

The portable centrifugal blasting unit above described is admirably designed for use in what is known as a blast cleaning room. The operator *o* may station himself, if this is desirable, within the room, suitably protected against rebounding abrasive by a protective jacket *o'*, a visor or helmet *o''* and gloves *o'''*. If it is unnecessary or undesirable for the operator to enter the cabinet, he may be conveniently positioned outside the cabinet with the manipulating handle 125 extending through an opening in the wall of the cabinet which is otherwise closed by flexible curtains. The operator then watches the blasting operation through a suitable window provided in the wall of the blast cleaning room. Such blast cleaning rooms are old and well known in the art and need not be described in detail. It is also appreciated that the portable unit herein described need not be operated from within or without a blasting room, but may be operated in the open with only such protective shields as may be necessary to partially enclose the work to prevent injury or damage to adjacent persons or objects from rebounding abrasive.

Before operating the unit, any necessary adjustment of the clockdial position of the discharge port 21 in the control cage with reference to the discharge opening 55 in the wheel housing is first made. Once the proper clockdial position of the control cage discharge port 21 has been determined, no further adjustment thereof need generally be made. The operator pushes the starting button 136 which throws the motor *m* into operation which rotates the abrasive throwing rotor *r* and its impeller *i*. When the rotor has been brought up to speed, the operator pulls the abrasive control rod 177, opening the valve 173 the desired amount to permit the abrasive to flow from the storage bin *b* into the funnel 190 through the conduit 40 and into the rotating impeller *i* by which it is thrown out through the discharge port 21 into the path of rotation of the blades 10 of the rotor *r*. The blades 10 of the rotor fires the abrasive at blasting velocity out through the discharge opening 55 in the wheel housing *h* in a generally fan-shaped stream of limited arcuate length. The operator swings the discharge opening 55 of the rotor housing into position adjacent the surfaces of the workpieces *w* to be cleaned and treated. Since the unit is suspended and can be swung bodily into various positions, the discharge opening 55 in the wheel housing can be brought progressively over the surface areas of the workpieces *w* to properly blast the same.

The operator *o* observes the degree of blast cleaning as he moves the discharge opening 55 of the housing over the surface areas of the workpieces. By turning the manipulating handle 125, the discharge opening 55 in the housing may be swung into substantially any clockdial position so that blasting is directed at any desired angle. It is important to note that the discharge port 21 in the control cage always maintains its proper relative position with respect to the discharge opening 55 in the housing *h* irrespective of the angular position into which the discharge opening 55 of the housing is swung. Very little effort is required to swing the discharge opening 55 into any desired blasting position since the supporting discs 85 and 86 to which the motor *m*, handle 125 and housing *h* are rigidly attached, are rotatably supported on the rollers 104 which roll around the circular tracks 101 of the stationary supporting straps 100. The rotor *r* and its impeller *i* are, of course, directly fixed to and supported by the shaft 61 of the motor *m*. Since both the power cable 151 and the abrasive supply conduit 40 are flexible, the driving motor *m* and housing *h* may be rotated within the circular supporting tracks 101 and may also be swung over a relatively wide area without interference. It will be noted that the contact point 79' of arm 70 is in alignment with the axis of the rotor *r* and motor *m* so that the arm 70 can pivot thereabout as the housing *h* is rotated. Thus the feed spout 41 remains in the downwardly inclined feeding position shown in Fig. 4 even though the housing *h* is rotated 360° or more, in which event the spout flange 48 merely slides on the rib 28 of the control cage. By referring particularly to Fig. 2, the housing *h* may be swung counterclockwise or to the left to move the housing opening from approximately

the six o'clock position to approximately the one o'clock position when the arm **74** will contact the downwardly inclined feed spout **41**. The housing opening **55** may be further swung to the twelve o'clock position without disturbing the abrasive flow through feed spout **41**, since the outer end portion of the feed pipe may be pushed over to approximately the eleven o'clock position without disturbing the downward flow of abrasive therethrough. The discharge opening **55** of the housing may be swung from the above described twelve o'clock position in a clockwise direction to the twelve o'clock position, in which event the arm **74** will push the feed spout **41** slightly to the left, as shown in Fig. 2, without interrupting the downward flow through the feed spout **41** which always remains in downwardly inclined position. It will be appreciated that proper sliding movement of the feed spout flange **48** on the control cage lip **28** is in no way disturbed when the spout **41** is swung slightly to the right or left, since the conical point **79'** on which it pivots is directly in line with the axis of rotation of the housing *h* and the axis of rotation of the wheel *r*, as well as the longitudinal axis of the control cage *c*.

As a modification, a ring member **210** may be secured to the inside face of the control cage *c* to retain the feed spout **41** in feeding position, as shown in Fig. 7, and yet permit 360° rotation of the control cage *c* and housing *h* thereabout. The ring member **210** may be angle-shaped in cross-section with one leg **211** thereof secured to the tubular wall of the control cage *c* as by bolts **212**. The other leg **213** provides a sliding abutment for the outturned flange **48** of the feed spout, so that the spout flange **48** is free to slide between the rib **28** and the leg **213**. The upward pull exerted by the conduit **40** on the spout **41** is sufficient to maintain the spout **41** in downwardly inclined discharging position irrespective of the position to which the housing opening **55** is rotated. The area over which the unit may be swung is obviously limited only by the length and character of the suspension device *t* employed. If desired, the normally stationary straps **100** may be supported upon a table or standard either stationary or movable. The centrifugal blasting unit lends itself to numerous different types and kinds of movable supports which are determined by the character of the workpieces and the position of the workpieces to be blasted.

The abrasive throwing rotor *r* may be made in almost any desired size, running from six inches in diameter to twenty inches or more in diameter. Abrasive throwing rotors constructed in accordance with this invention have been successfully used which are only eight inches or less in diameter with abrasive throwing blades **10** approximately only two or three inches long and three-quarters of an inch wide. Approximately only a one-horsepower motor is required to drive such a wheel, which will throw from twenty to thirty pounds of abrasive per minute. Almost any desired quantity of abrasive can be thrown by providing a wheel of sufficient diameter with blades of sufficient width. Such wheels may be built to throw as small a quantity as ten pounds of abrasive per minute or less up to 2000 pounds of abrasive or more per minute.

Abrasive throwing wheels associated with a portable unit of the type herein described, are admirably adapted for blast cleaning operations where high pressure air blast has been heretofore used and considered the only feasible method of cleaning large, awkward or cumbersome castings and forgings. With this portable unit surface areas of castings which have only been partially cleaned by other methods can be touched up and finished, which has heretofore been done only by hand manipulated air blast nozzles. The irregular cavities in cylinder blocks and interior surfaces of steel barrels, and numerous other objects can be effectively, uniformly and economically blast cleaned and treated by the portable centrifugal blasting unit herein described, at a fraction of the cost of similar cleaning operations employing either hand or mechanically manipulated air blast nozzles. For example, a small eight inch disc wheel driven by only one horsepower motor will easily fire thirty pounds of abrasive per minute, whereas an air blast nozzle throwing a like quantity would consume compressed air which would require from fifteen to twenty horsepower to develop. This portable centrifugal blasting unit supplies the flexibility of operation which only an air blast gun has heretofore provided, at substantially reduced operating cost.

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 portable centrifugal blasting unit including in combination, a driving motor having a normally stationary outer casing and a projecting rotatable drive shaft, an abrasive throwing wheel fixedly mounted on said projecting drive shaft, a guard housing for said wheel fixedly connected to said motor casing and having an abrasive discharge opening, abrasive control means fixed to said housing for directing the abrasive fired from said wheel through said opening, means for supplying abrasive to said control means including a flexible conduit terminating in a downwardly inclined spout portion, and means associated with said spout portion and said housing for movably retaining said spout portion in downwardly inclined feeding relationship with respect to said control means whereby said housing may be rotated about an axis in alignment with the discharge end of said spout portion, means for rotatably supporting said motor and housing, and means fixedly connected to said motor casing for manipulating the discharge opening in said housing into various clockdial positions.

2. A portable centrifugal blasting unit including in combination, a driving motor having a normally stationary outer casing and a projecting rotatable drive shaft, an abrasive throwing wheel fixedly mounted on said projecting drive shaft, a guard housing for said wheel fixedly connected to said motor casing and having an abrasive discharge opening, abrasive control means fixed to said housing for directing the abrasive fired from said wheel through said opening, means for supplying abrasive to said control means including an abrasive supply bin, a flexible conduit connected to said bin and terminating in a downwardly inclined spout portion, and means associated with said spout portion and said housing for movably retaining said spout portion in downwardly inclined feeding relationship with respect to said control means whereby said hous-

ing may be rotated about an axis in alignment with the discharge end of said spout portion, means for rotatably supporting said motor and housing, and means fixedly connected to said motor casing for manipulating the discharge opening in said housing into various clockdial positions.

3. A portable centrifugal blasting unit including in combination, a driving motor having a normally stationary outer casing and a projecting rotatable drive shaft, an abrasive throwing wheel fixedly mounted on said projecting drive shaft, said wheel having a plurality of radially arranged blades extending inwardly short of the axis of rotation of said wheel to provide a central space, a guard housing for said wheel fixedly connected to said motor casing and having an abrasive discharge opening, a tubular abrasive control member extending into said space and fixed to said housing for directing the abrasive fired from said wheel through said opening, means for supplying abrasive to said control member including a flexible conduit terminating in a downwardly inclined spout portion, and means associated with said spout portion and said housing for movably retaining said spout portion in downwardly inclined feeding relationship with respect to said control member whereby said housing may be rotated about an axis in alignment with the discharge end of said spout portion, means for rotatably supporting said motor and housing, and means fixedly connected to said motor casing for manipulating the discharge opening in said housing into various clockdial positions.

4. A portable centrifugal blasting unit including in combination, a driving motor having a normally stationary outer casing and a projecting rotatable drive shaft, an abrasive throwing wheel fixedly mounted on said projecting drive shaft, said wheel having a plurality of radially arranged blades extending inwardly short of the axis of rotation of said wheel to provide a central space, a tubular control member extending into said central space having an abrasive discharge port in the tubular side wall thereof, an impeller positioned within said tubular control member fixed to rotate with said blades and operable to project abrasive through the discharge port in said control member and into the path of rotation of said blades, a guard housing for said wheel fixedly connected to said motor casing and having an abrasive discharge opening, means for adjustably securing said control member to said housing whereby the abrasive fired from said wheel is directed through said opening, means for supplying abrasive to said control member including a flexible conduit terminating in a downwardly inclined spout portion, and means associated with said spout portion and said housing for movably retaining said spout portion in downwardly inclined feeding relationship with respect to said control member whereby said housing may be rotated about an axis in alignment with the discharge end of said spout portion, means for rotatably supporting said motor and housing, and means fixedly connected to said motor casing for manipulating the discharge opening in said housing into various clockdial positions.

5. A portable centrifugal blasting unit including in combination, a driving motor having a normally stationary outer casing and a projecting rotatable drive shaft, an abrasive throwing wheel fixedly mounted on said projecting drive shaft, a guard housing for said wheel fixedly connected to said motor casing and having an abrasive discharge opening, abrasive control means fixed to said housing for directing the abrasive fired from said wheel through said opening, means for supplying abrasive to said control means including a flexible conduit terminating in a downwardly inclined spout portion, and means associated with said spout portion and said housing for movably retaining said spout portion in downwardly inclined feeding relationship with respect to said control means whereby said housing may be rotated about an axis in alignment with the discharge end of said spout portion, a suspension device for rotatably supporting said motor and housing, and means for manipulating the discharge opening in said housing into various clockdial positions, said manipulating means being fixedly connected to said motor casing at a point removed from said shaft and out of the path of rebounding abrasive.

6. A portable blasting unit including in combination, a driving motor having a normally stationary enclosing casing and a projecting rotatable drive shaft, an abrasive throwing wheel fixedly mounted on said projecting drive shaft, a guard housing for said wheel having a brasive discharge opening, a framework fixed to said motor casing and to said guard housing, abrasive control means fixed to said housing operable to direct abrasive fired from said wheel through said opening, means for supplying abrasive to said control means including a flexible conduit terminating in a downwardly inclined spout portion, and means associated with said spout portion and said housing for movably retaining said spout portion in downwardly inclined feeding relationship with respect to said control means whereby said housing may be rotated about an axis in alignment with the discharge end of said spout portion, a movable suspension device, means connected to said suspension device for rotatably supporting said framework, and means connected to said framework for manipulating said motor and housing so as to position the discharge opening in said housing in various clockdial positions.

7. A portable blasting unit including in combination, a driving motor having a projecting rotatable drive shaft, an abrasive throwing wheel fixedly mounted on said projecting drive shaft, a guard housing for said wheel having an abrasive discharge opening, a framework for supporting said motor and housing, means for fixedly connecting said housing to said framework, abrasive control means fixed to said housing operable to direct abrasive fired from said wheel through said opening, means for supplying abrasive to said control means including a flexible conduit terminating in a downwardly inclined spout portion, and means associated with said spout portion and housing for movably retaining said spout porton in downwardly inclined feeding relationship with respect to said control means whereby said housing may be rotated about an axis in alignment with the discharge end of said spout portion, spaced generally circular track members upon which said framework is rotatably supported, movable means for supporting said track members, and means connected to said framework for manipulating said motor and housing so as to position the discharge

opening in said housing in various clockdial positions.

8. A portable blasting unit including in combination, a driving motor having an enclosing casing and a projecting rotatable drive shaft, an abrasive throwing wheel fixedly mounted on said projecting drive shaft, a guard housing for said wheel having an abrasive discharge opening, spaced circular discs secured to said motor casing, means for securing said housing to said discs, abrasive control means fixed to said housing operable to direct abrasive fired from said wheel through said opening, a flexible conduit for supplying abrasive to said control means, a circular track member rotatably supporting each of said discs, a movable suspension device connected to said track members, and means connected to one of said discs for manipulating said motor casing and housing so as to position the discharge opening in said housing in various clockdial positions.

9. A portable blasting unit including in combination, a driving motor having a projecting rotatable drive shaft, an abrasive throwing wheel fixedly mounted on said projecting drive shaft, a guard housing for said wheel having an abrasive discharge opening, a framework for supporting said motor and housing, means for fixedly securing said housing to said framework, abrasive control means fixed to said housing operable to direct abrasive fired from said wheel through said opening, means for supplying abrasive to said control means including a flexible conduit terminating in a downwardly inclined spout portion, and means associated with said spout portion and housing for movably retaining said spout portion in downwardly inclined feeding relationship with respect to said control means whereby said housing may be rotated about an axis in alignment with the discharge end of said spout portion, a movable suspension device, means connected to said suspension device for rotatably supporting said framework, a hand wheel connected to said framework nearest the end of said motor most removed from said wheel for manipulating the unit so as to position the discharge opening in said housing in various clockdial positions, and electrical control means positioned adjacent said hand wheel for controlling the operation of said motor.

10. A portable blasting unit including in combination, a driving motor having a projecting rotatable drive shaft, an abrasive throwing wheel fixedly mounted on said projecting drive shaft, a guard housing for said wheel having an abrasive discharge opening, a framework for supporting said motor and housing, means for fixedly connecting said housing to said framework, abrasive control means fixed to said housing operable to direct abrasive fired from said wheel through said opening, a flexible conduit for supplying abrasive to said control means, a movable suspension device, means connected to said suspension device for rotatably supporting said framework, a tubular member connected to said framework, a hand wheel fixed to said tubular member for manipulating the unit so as to position the discharge opening in said housing in various clockdial positions, and electrical control means positioned centrally of said hand wheel and housed within said tubular member for controlling the operation of said motor.

11. A portable centrifugal blasting unit including in combination, a driving motor having a normally stationary casing and a projecting rotatable drive shaft, an abrasive throwing wheel fixedly mounted on said projecting drive shaft, said wheel including a rotor head having a plurality of generally radially arranged abrasive throwing blades extending inwardly short of the axis of rotation of said rotor head to provide a central space, a guard housing for said wheel having an abrasive discharge opening fixedly connected to said motor casing, a tubular control member extending into said central space having an abrasive discharge outlet in the tubular side wall thereof for directing abrasive onto the inner ends of said blades at a predetermined clockdial position, an impeller positioned within said tubular control member and fixed to rotate with said blades for projecting the abrasive through the discharge outlet in said control member, means for adjustably securing said control member to said housing for directing the abrasive fired from said wheel through said opening, means for supplying abrasive to said tubular control member, means for rotatably supporting said unit, and means connected to said motor casing for manipulating the discharge opening in said housing into various clockdial positions, said abrasive supply means including a flexible conduit terminating in a downwardly inclined spout portion, means providing an abrasive seal between said spout portion and said tubular control member, and means movably securing said spout portion to said housing whereby said housing and said control member may be rotated about an axis in alignment with the discharge end of said spout portion.

12. A portable centrifugal blasting unit including in combination, a driving motor having a normally stationary casing and a projecting rotatable drive shaft, an abrasive throwing wheel connected to said projecting drive shaft, a guard housing for said wheel having an abrasive discharge opening fixedly connected to said motor casing, abrasive control means fixed to said housing for directing the abrasive fired from said wheel through said opening, an abrasive supply bin, a flexible conduit terminating in a downwardly inclined spout portion for conducting abrasive from said bin to said control means, means for rotatably supporting said unit, means providing an abrasive seal between said spout portion and said control means, means fixedly connected to said motor casing for manipulating the discharge opening in said housing into various clockdial positions, and means providing a swivel connection between said spout portion and said control means whereby said spout portion is maintained in downwardly inclined feeding position when said housing is rotated about said spout portion.

13. A portable centrifugal blasting unit including in combination, a driving motor having a normally stationary outer casing and a projecting rotatable drive shaft, an abrasive throwing wheel fixedly mounted on said projecting drive shaft, said wheel having a plurality of radially arranged blades extending inwardly short of the axis of rotation of said wheel to provide a central space, a guard housing for said wheel fixedly connected to said motor casing and having an abrasive discharge opening, a tubular abrasive control member extending into said space and fixed to said housing for directing the abrasive fired from said wheel through said opening, means for supplying abrasive to said control member including a

flexible conduit terminating in a downwardly inclined spout portion, and means associated with said spout portion and said housing for movably retaining said spout portion in downwardly inclined feeding relationship with respect to said control member whereby said housing may be rotated about an axis in alignment with the discharge end of said spout portion, means for rotatably supporting said motor and housing, and means fixedly connected to said motor casing nearest that end of said motor which is opposite to the end mounting said wheel for manipulating the discharge opening in said housing into various clockdial positions.

14. A portable blasting unit including in combination, a driving motor having an enclosing casing and a projecting rotatable drive shaft, an abrasive throwing wheel fixedly mounted on said projecting drive shaft, a guard housing for said wheel having an abrasive discharge opening, spaced circular discs secured to said motor casing, means for securing said wheel housing to said discs, abrasive control means fixed to said housing operable to direct abrasive fired from said wheel through said opening, a flexible conduit for supplying abrasive to said control means, a circular track member rotatably supporting each of said discs, a motor housing fixed to said tracks enclosing said tracks, motor and motor casing, a movable suspension device connected to said track members, and means connected to one of said discs for manipulating said motor casing and housing so as to position the discharge opening in said housing in various clockdial positions.

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