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ABRASIVE EQUIPMENT

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Fig. 1

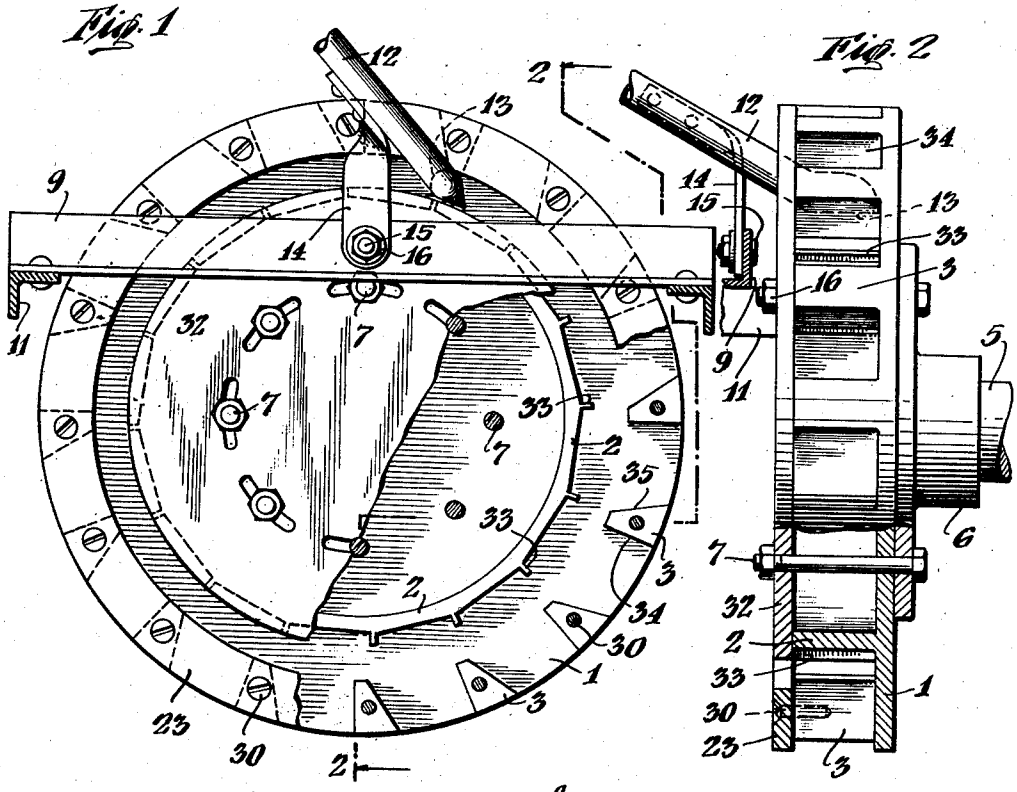
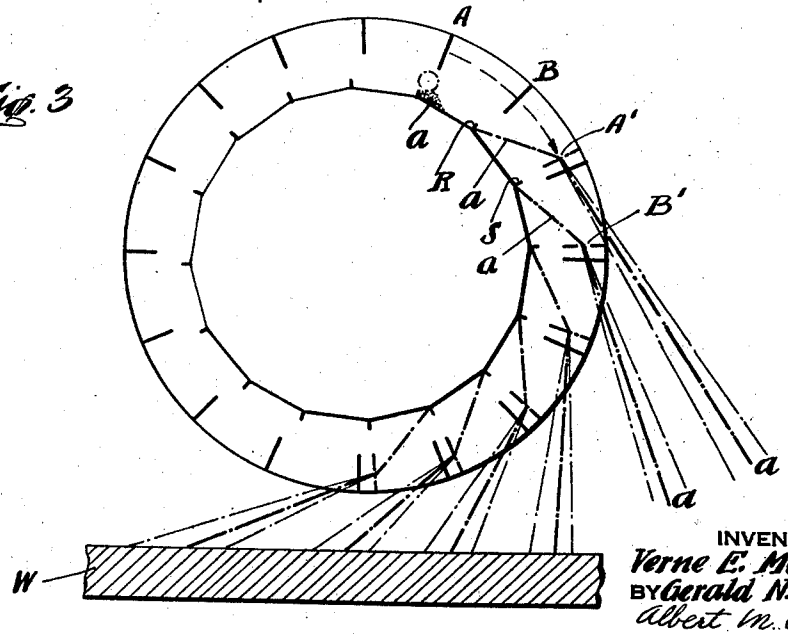


Fig. 2

Fig. 3



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ABRASIVE EQUIPMENT

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8 Claims. (Cl. 51—9)

This invention relates to abrasive equipment nd more particularly to certain improvements ı apparatus for cleaning metal sheets, castings nd the like. This application is a division of ır copending application, Serial No. 704,777, led December 30, 1933.

This invention is concerned with the provision improved means for feeding abrasive into the ath of the moving blades. The machine com- ises generally a rotor including a disc which ay be removably mounted on a rotatably ounted drive shaft. A drum member is cen- ally mounted on one side of the disc. The ades project from the drum side of the disc id are arranged in uniform spaced relationship. The abrasive is fed on to the outer periphery the drum by means of a feed pipe which may adjustable in position to deposit the abrasive ı the drum periphery at the desired point. The um periphery may be provided with a plural- of transversely extending ribs which may be ranged in radially staggered relationship to e throwing blades of the machine. The ribs corrugations operate to collect the abrasive scharged from the feed pipe as individual arges which are thrown by the ribs into the ath of the moving blades. By means of this rangement more complete directional control the thrown abrasive, as well as a more uniform stribution of the abrasive over the surface op- ated upon, is accomplished. Each blade picks a regulated amount of the abrasive charge rown in front of it. The blade operates to ange the direction of the movement of the rasive particles into approximately the direc- n of the moving blades. Substantially simul- neously the blade operates to throw the abra- e at blasting velocity in a predetermined di- tion. The blades are made of wear resisting tal and are preferably of considerable thick- ss to resist wear.

An object of this invention is to provide an proved abrasive machine so constructed as to ow the abrasive at an abrading velocity ainst the work operated upon under full di- tional control and distribute the abrasive uni- mly over the surface being treated.

Another object of this invention is to provide proved means for feeding the abrasive into path of the moving blades in the most effec- e and efficient manner.

Another object of this invention is to provide improved abrasive throwing machine which nprises few moving parts, which is simple and ong in construction, which can be economi- cally made and assembled, which has a low power consumption for the work done, which imparts to the abrasive a highly effective abrading velocity, which occupies a small space area, which effects uniform distribution of the abrasive over the work, and which is highly adaptable for the cleaning of metal sheets, castings, forgings, metal parts and other articles.

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

In order that a clearer understanding of our invention may be had, attention is hereby directed to the accompanying drawing, forming part of this application and illustrating certain possible embodiments of our invention.

Referring to the drawing:

Fig. 1 is a face view of the centrifugal abrading machine, certain parts being broken away to illustrate certain features of the construction;

Fig. 2 is a vertical cross sectional view through the machine shown in Fig. 1, this view being taken on line 2—2 of Fig. 1; and

Fig. 3 is a diagrammatic view illustrating the operation of the machine shown in Figs. 1 and 2.

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

The centrifugal abrading machine, as shown in Figs. 1 and 2, comprises generally a disc member 1 of wear resisting metal and of generally circular shape removably mounted on a rotatable drive shaft 5. The hub 6 fixed to the disc 1 by means of removable bolts 7 connects the drive shaft 5 to the disc 1. A member having a generally cylindrical side wall portion 2 is centrally mounted on the disc, which member may be referred to, for convenience in description, as a drum. The drum side wall portion 2 may be cast as an integral part of the disc member 1 if desired. Ribs or corrugations 33 are positioned at spaced intervals across the side wall 2 of the drum. A plurality of blades 3 are radially arranged in uniform spaced relationship around the periphery of the disc member 1. The blades 3 may be cast integral with the disc 1 or they may be detachably secured thereto as found convenient and desirable. The blades 3 are preferably made of hard wear resisting metal and are of considerable thickness to give long wear. The radial length of the blades and the drum diameter may both be varied as circumstances may require. The blades 3 supported by the disc member 1, are radially arranged and uniformly spaced apart around the disc member 1 so as to provide a clear passage between adjacent

blades. The blades as shown should be so shaped and spaced that the rear face 35 of one blade and the throwing face 34 of the following blade provide a free and open discharge outlet therebetween through which the abrasive may move. A ring member 23 joining the blades 3 may be provided to give rigidity to the assembly. The ring member 23 may be cast integral with the blades 3 and the disc 1 or it may be bolted or otherwise secured thereto as by screws or bolts 30.

The feed pipe 12 may be adjustably supported by means of a bracket 14, one end of which is secured to the feed pipe and the other end adjustably secured as by bolt 15 and nut 16, to the frame member 9 supported on a suitable frame 11, as shown in Figs. 1 and 2. The feed pipe 12 is held stationary during the operation of the machine but may be adjusted so as to position the discharge end 13 of the feed pipe 12 at the desired position with respect to the drum periphery 2. The direction of discharge of the abrasive from the rotor can thus be varied as desired.

The abrasive *a* discharged from the discharge end 13 of the feed pipe gathers or drifts against the advancing side of the ribs 33 and is thrown as separate charges into the path of the moving blades 3. Satisfactory results have been obtained by providing a rib 33 on the drum 2 for each blade 3 spaced peripherally about the drum 2. The ribs 33 are also preferably arranged in staggered relationship with respect to the blades 3 as illustrated more particularly in Figs. 1 and 3, so that the abrasive charge will be thrown between the blades 3 before it is struck by the following blade 3. The abrasive thrown from the respective ribs 33 travels at less velocity than the moving blades 3. Consequently, the abrasive is struck by a blade 3 which follows the rib 33 from which it is thrown. As illustrated more particularly in Fig. 3, it is believed that the abrasive charge *a* thrown forwardly by the rib R is struck by the following blade A at the point A' and the abrasive thrown from the rib S is struck by the blade B when it arrives at the point B'. The wheel travels at approximately 2250 revolutions per minute and the abrasive *a* is thus impinged upon the work W with abrasive velocity uniformly over a path which is approximately twice the diameter of the rotor. For example, a rotor having a diameter of nineteen and one-half inches moving at a speed of 2250 revolutions per minute would effectively clean a path approximately two and one-half to three and one-half feet in length with the work advancing from under the wheel from six to ten feet per minute. The abrasive thrown by the ribs 33 in charges is thrown and dispersed by the blades 3 so as to clean the work evenly and uniformly over the area acted upon. The abrasive is caught by the ribs 33 and is thus prevented from slipping or sliding along the periphery of the rotating drum. Consequently, the abrasive *a* is thrown by the ribs 33 at a speed which approaches the speed of the rotating ribs 33 thus obtaining a maximum speed efficiency. When the moving blades 3 contact the abrasive the speed which it has attained by reason of the action of the moving ribs 33 is further augmented and increased without any appreciable loss of speed by reason of interference from the blades or other parts of the machine.

The open side of the drum 2 may be closed by a disc 32 which may be cast integral with the drum 2 or bolted thereto by means of the through bolts 7. The space between the outer edge of the closure disc 32 and the ring 23 provides ample space for insertion of the discharge end 13 of the feed pipe 12.

The machine above described possesses a high degree of efficiency. The velocity given the abrasive by the throwing action exerted by the rotating ribs is not slowed up or impaired by any interference due to the blade action. The blades 3 pick up the flying abrasive and augment or increase its velocity to substantially the velocity of the rotating blades 3. When the machine is rotated at approximately 2250 revolutions per minute, the abrasive is given a velocity sufficient to efficiently and effectively scour forgings and castings of the hardest material.

The direction in which the abrasive is thrown may be regulated by adjusting the discharge end 13 of the feed pipe with respect to the moving ribs and blades. The abrasive is discharged from approximately one-fourth of the wheel circumference under normal operating conditions of 2250 revolutions per minute. The area of discharge, however, will depend upon the rotating speed of the machine, the length of the blades, the position of the discharge outlet, the rib diameter and the position of the machine with respect to the work.

The position of the ribs 33 with respect to the blades 3 of the machine shown in Figs. 1 and 2 may be varied as found desirable. This object may be accomplished by providing a drum 2 which is adjustably mounted upon the disc 1 so that the ribs 33 are automatically adjusted in the desired position with respect to the blades 3 by adjusting the position of the drum 2 with respect to the disc 1.

The machine above described is adapted for a variety of different uses such as for the cleaning of metal sheets and other articles. The machines may be mounted on any suitable apparatus. The machine is made of few parts, and may be inexpensively manufactured and assembled. It is furthermore, strong and durable in construction, safe and substantially foolproof in operation, requires little floor space, and is highly efficient.

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. An airless abrasive machine comprising in combination, a rotatable drum, means for depositing abrasive on the outer periphery of said drum and a plurality of radially arranged blades spaced from said drum for throwing the abrasive as it leaves the rotating drum, said drum having a plurality of ribs extending transversely across the outer periphery thereof, said ribs being arranged in radially staggered relationship with respect to said blades.

2. An airless abrasive machine comprising in combination, a rotatable drum, means for depositing abrasive on the outer periphery of said drum, and a plurality of radially arranged blades spaced from said drum and operative to throw the abrasive as it leaves the rotating drum, said drum having a plurality of spaced ribs extending transversely across the outer periphery thereof, said ribs being operative to throw successive charges of abrasive into the path of said moving blades.

3. A centrifugal blasting machine comprising

in combination, a rotatably mounted disc, throwing blades carried by said disc and radially arranged thereon, said throwing blades terminating inwardly short of the axis of rotation of said disc, and means for controlling the direction of abrasive discharged from the periphery of said blades, said means including an axially extending member presenting a continuous wall surface surrounding the axis of rotation of said disc and fixed to rotate therewith, a plurality of deflector ribs peripherally carried by said member, said control means being operative to assemble abrasive as individual charges and transfer said charges to said blades, and abrasive feeding means having a discharge outlet of limited peripheral length for directing the abrasive radially inwardly first over the peripheral free edges of said ribs in a direction generally toward the axis of rotation of said disc whereby said abrasive is engaged by the advancing faces of said ribs over a limited arc of rotation thereof whereby the abrasive is transferred by said control means to said blades across the inner ends thereof and is discharged by said blades over a limited arc described by the path of rotation of the outer ends of said blades.

4. A centrifugal blasting machine comprising in combination, a rotatably mounted disc, spaced substantially radially arranged abrasive propelling blades carried by said disc and extending inwardly short of the axis of rotation thereof, and means for controlling the direction of discharge of the abrasive from the outer periphery of said blades, said means including an axially extending member fixed to rotate with said disc having a plurality of deflector ribs equal in number to said throwing blades, said member presenting a continuous outer surface upon which said ribs are radially arranged in spaced relationship, said ribs having the outer peripheral edges thereof spaced from the axis of rotation of said disc, said control means being operative to assemble said abrasive as individual charges on the advancing faces of said ribs, and an abrasive supply conduit for feeding abrasive generally radially inwardly first over the peripheral free edges of said ribs in a direction generally toward the axis of rotation thereof whereby each abrasive charge is transferred by each rib across the inner end of its corresponding blade and is discharged by said blades over a limited arc described by the path of rotation of the outer ends of said blades.

5. A centrifugal blasting machine comprising in combination, a rotatably mounted rotor head having throwing blades supported by said head and radially arranged thereon, said throwing blades terminating inwardly short of the axis of rotation of said rotor head to define a central space, means for feeding abrasive to said blades, said means including a support having a substantially continuous outer surface mounted on said rotor head extending into said central space for rotation with said blades, and a plurality of spaced deflector ribs peripherally carried by said support, said feeding means being operative to assemble abrasive as individual charges and to transfer said charges to the inner ends of said blades, and abrasive supply means having a discharge port positioned to direct abrasive first over the peripheral free edges of said ribs inwardly toward the axis of rotation of said rotor head and into the path of the advancing faces of said ribs over a limited portion of their path of rotation whereby said abrasive is transferred by said feeding means to said blades across the inner ends thereof and is discharged by said blades over a predetermined concentrated zone.

6. A centrifugal blasting machine comprising in combination, a rotatably mounted disc, throwing blades carried by said disc and radially arranged thereon, said throwing blades terminating inwardly short of the axis of rotation of said disc to define a central space, and means for feeding abrasive to said blades, said feeding means including a support having a continuous outer wall surface extending axially into said central space mounted for rotation with said blades, and a plurality of deflector ribs peripherally carried by said support, said feeding means being operative to assemble abrasive as individual charges and to transfer said charges to said blades, and means for conducting abrasive first across the peripheral edges of said ribs in a direction toward the axis of rotation of said disc and into the path of movement of the advancing faces of said ribs, said abrasive conducting means having a discharge outlet of limited peripheral extent positioned adjacent the path of rotation prescribed by the peripheral edges of said ribs whereby abrasive is supplied to said feeding means over a limited sector only.

7. A centrifugal blasting machine comprising in combination, a rotatably mounted rotor head, throwing blades carried by said rotor head and radially arranged thereon, said blades having a radial length which is a fraction of the rotor head radius, means for feeding abrasive to said blades including an axially extending support having a continuous outer surface centrally mounted on said rotor head and a plurality of spaced deflector ribs peripherally carried by said support, said feeding means being operative to assemble abrasive as individual charges and delivering the same to said blades over the inner ends thereof, and means for conducting abrasive first over the peripheral free edges of said ribs in a direction toward the axis of rotation of said rotor head and over a limited portion of the path of travel of said ribs whereby said abrasive is delivered to said blades over a limited portion of their path of travel.

8. A machine for cleaning metal sheets, castings and the like which includes, rotatably mounted throwing blades, a drum, means for depositing a stream of abrasive at a predetermined point on the outer periphery of said drum, means associated with said drum for assembling the abrasive as individual charges, means for rotating said drum at speeds sufficient to throw each charge of the abrasive tangentially therefrom and thus give the charge an initial velocity in the general direction of rotation of said blades, said blades being operative to hurl the moving abrasive so as to increase the velocity thereof sufficient to exert a uniform abrasive action upon the material to be cleaned when impinged by the abrasive particles.

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