May 9, 1961 C. M. GOSSARD 2,983,082

ABRASIVE THROWING VANES WITH RIBBED WEARING FACE

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Fig. 1.

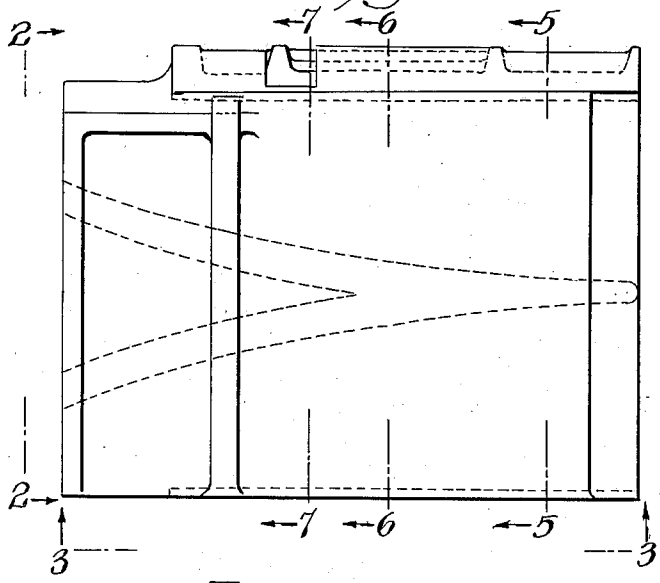


Fig. 2.

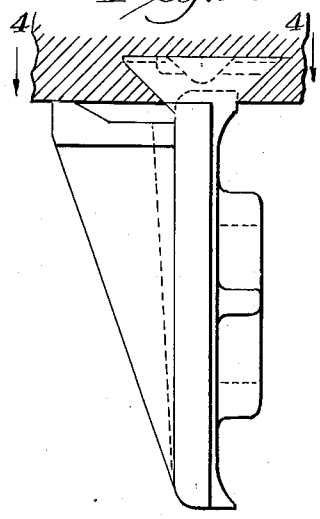


Fig. 4.

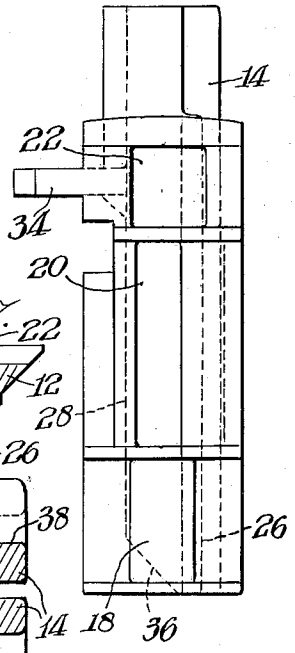


Fig. 3.

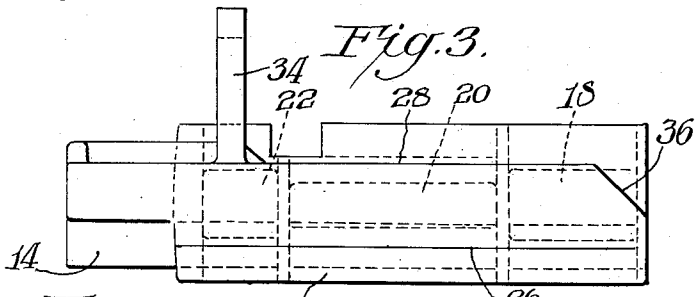


Fig. 5.

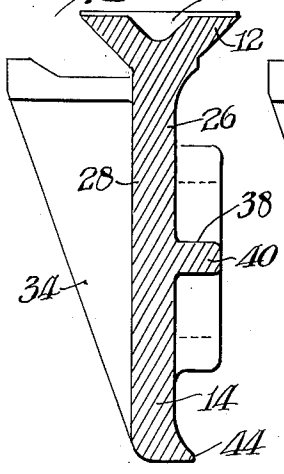


Fig. 6.

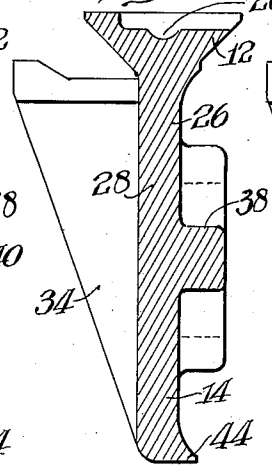


Fig. 7.

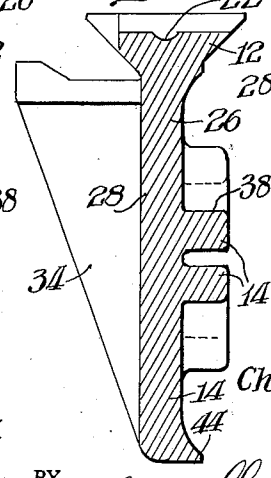


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Fig. 9.

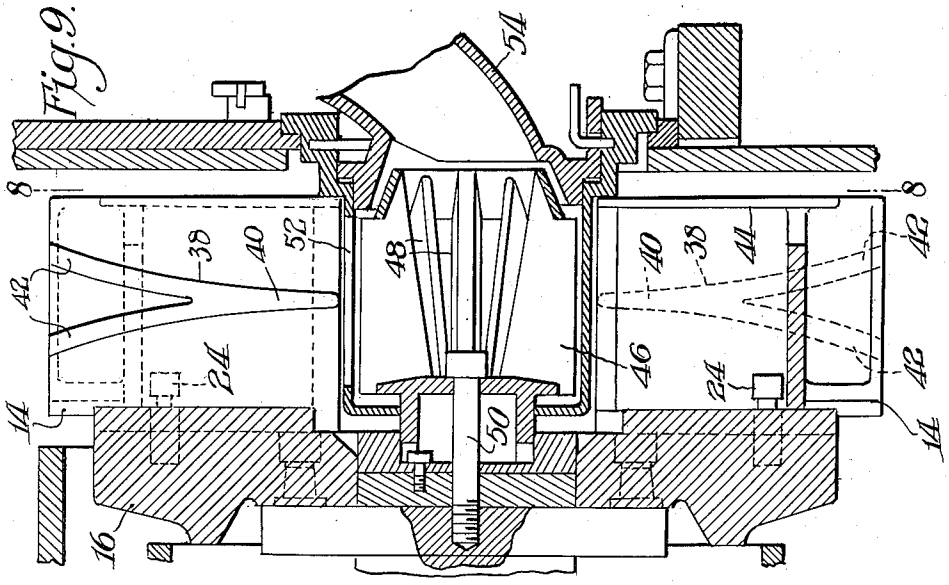
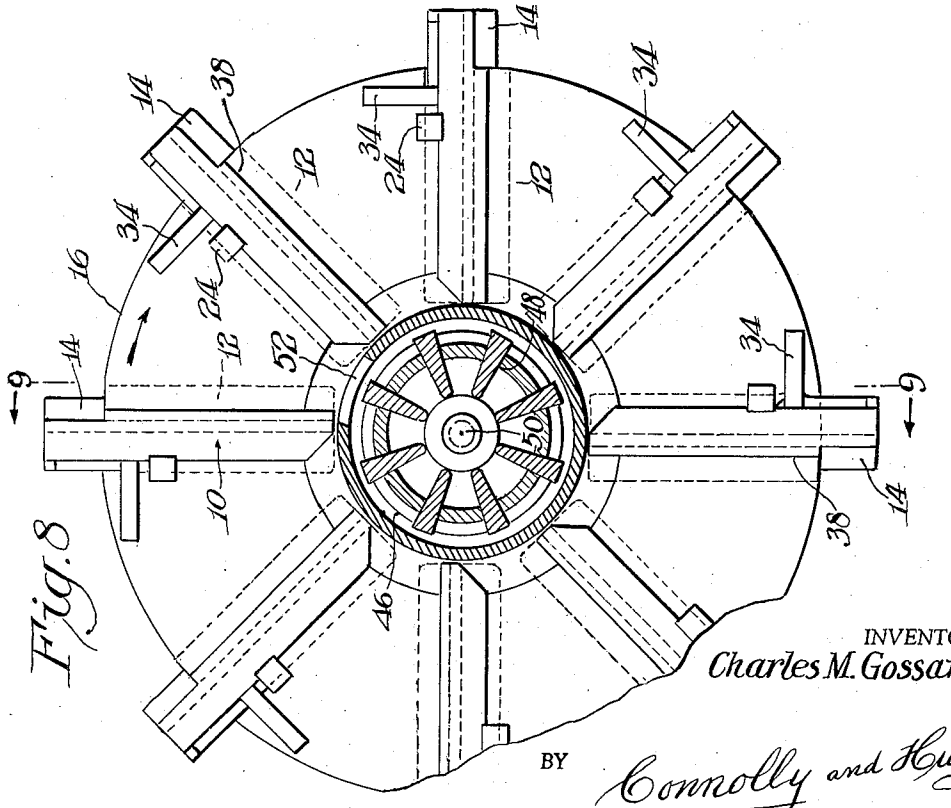



Fig. 8

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United States Patent Office 2,983,082 Patented May 9, 1961



2,983,082

# ABRASIVE THROWING VANES WITH RIBBED WEARING FACE

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Filed Apr. 24, 1958, Ser. No. 730,600

8 Claims. (Cl. 51—9)

This invention relates to abrasive throwing wheels, and it particularly relates to the vanes used on such throwing wheels for receiving the abrasive particles and projecting them during rotation of the wheel in a blast stream.

Abrasive throwing wheels equipped with projecting vanes have long been used in the industry. However, the efficiency of the operation has heretofore never reached a maximum value because of the shape of the vanes. Substantially all vanes heretofore used were provided with flat projecting surfaces bounded by lateral ribs at the longitudinal outer edge; these ribs serving to confine the abrasive particles to the throwing surfaces of the vanes. This type of blade projected the abrasive particles in a pattern corresponding in width to the width of the projecting surface of the vane. The abrasive particles, after striking the workpiece, tended to rebound in various uncontrolled directions. A large proportion of the rebounding particles passed back through the succeeding streams of projected particles resulting in thousands of collisions between the projected particles and the rebounding particles. This cut down tremendously on the number of abrasive particles striking the workpiece and consequently greatly reduced the total efficiency of the blast stream. Furthermore, the numerous collisions of the particles broke them into such fine fragments that they could no longer be recycled for further blasting which could be done with many of those particles which did strike the workpiece.

It is one object of the present invention to overcome the above as well as other disadvantages of the prior art by providing a vane construction which greatly diminishes the number of abrasive particle collisions.

Another object of the present invention is to provide a vane construction which increases the quantity of abrasive material that the throwing wheel can handle efficiently and effectively.

Another object of the present invention is to increase the blast efficiency of the throwing wheel and the wear life of the abrasive material.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Fig. 1 is a rear elevational view of a vane embodying the present invention;

Fig. 2 is an end view taken on line 2—2 of Fig. 1, the vane being shown mounted on the throwing wheel;

Fig. 3 is a side view taken on line 3—3 of Fig. 1;

Fig. 4 is a side view taken on line 4—4 of Fig. 2 with the vane removed from the wheel;

Fig. 5 is a sectional view taken on line 5—5 of Fig. 1;

Fig. 6 is a sectional view taken on line 6—6 of Fig. 1;

Fig. 7 is a sectional view taken on line 7—7 of Fig. 1;

Fig. 8 is a front elevational view of a throwing wheel provided with vanes embodying the present invention; and

Fig. 9 is a view, partly in elevation and partly in section, taken on line 9—9 of Fig. 8 with the wheel shown partly enclosed in a housing.



Briefly stated, the present invention contemplates the attainment of the above objectives by splitting the abrasive stream as it issues from the throwing wheel and diverting each split portion of the stream so that each impacts the workpiece at a different angle from the other stream; whereby any particles which rebound from the surface of the workpiece rebound away from the oncoming abrasive stream. In this manner, the number of abrasive particle collisions is greatly reduced. This is accomplished by forming a particularly contoured rib on the throwing surface of each vane, this rib being long and narrow at the radially inner end of the vane and then splitting into two increasingly divergent arms as it extends toward the radially outer end of the vane.

Referring now in greater detail to the particular figures of the drawings wherein similar reference characters refer to similar parts, there is shown a vane, generally designated 10, comprising a base 12 and a blade 14. The base 12 is of wedge-shaped cross-section (as best shown in Figs. 2, 5, 6 and 7) to slidably fit within a complementary radial channel on the face of the runner head of a throwing wheel 16. The rear face of the base 12 is provided with three longitudinally spaced slots 18, 20 and 22; the slot 20 being adapted to receive a leaf spring. Adjacent slots 20 and 22 a notch 23 is provided along a side edge of the base to receive a locking pin 24 that holds the vane by projecting into an opening in the face of the throwing wheel. This particular spring and pin locking structure is standard and since, by itself, it forms no part of the present invention, it is not necessary to go into any detailed description thereof at this time.

Extending from the apex portion of the base 12 is the blade 14. The blade 14 is provided with a throwing surface 26 of generally flat configuration and a rear surface 28. On the rear surface 28, at the outer edge thereof, there is provided a reinforcing rib 30 having a longitudinal extension 32 for reinforcing that portion of the blade which extends beyond the base 12. A second wedge-shaped rib 34 extends transversely across the rear face 28 parallel to rib 30; this rib 34 being of substantial dimensions and serving as a strong bracing means for the blade by abutting the face of the runner head (as shown in Fig. 2). At its inner end, the blade 14 is provided with a beveled edge 36 on the rear face 28 whereby this inner end provides a relatively small obstructing surface at the abrasive feed opening (described below).

On the front or throwing surface of the blade 14 there is provided a generally Y-shaped rib 38 having a relatively narrow single edged portion 40 adjacent the inner end of the blade and splitting to form two divergent legs 42 at the opposite end. At the free longitudinal edge of the blade is provided a lateral rib 44 for confining the abrasive particles to the throwing surface of the blade during rotation of the wheel.

The vanes 10 are mounted on the front face of the runner head of throwing wheel 16 by inserting the leaf spring (not shown) in the seat 20 and sliding the base 12 of each vane into the respective radial channel on the wheel face. Then the locking pin 24 is inserted through notch 23 into the corresponding opening in the runner head face to hold the vane in place. In this position, each van extends radially outward from a hub formed by a feed cage 46. The wheel 16 is mounted for rotation around the hub formed by cage 46. Within cage 46 is a rotatable impeller 48 which, through its connection to the wheel 16 by means of bolt 50, is adapted to rotate with the wheel 16. An abrasive feed opening 52 is provided on one portion of the periphery of the cage 46 while abrasive particles are fed into the cage through a spout

54 in the wall of the housing surrounding the throwing wheel.

In the operation of the device, the wheel is placed in rotation, abrasive particles are fed through spout 54 into the cage 46 where they are scooped up by the vanes of the impeller 48 and whirled around in such manner that a portion thereof is continually propelled out of the feed opening 52 onto the blades 14 of the vanes 10 as the blades rotate around the cage. The abrasive particles, as they fall onto the blades 14, are propelled along the length of the blades by centrifugal force so that they fly off the radially outer ends thereof. However, by the present construction, as the particles pass along the blades, they are divided into two separate streams by the ribs 38 and are projected away from the blades in two divergent streams whereby, upon striking the workpiece surface, they rebound away from the oncoming abrasive streams.

Although the above device has been described as having a rib configuration consisting of only two convergent ribs, it is within the scope of this invention to use more than two such convergent ribs. Furthermore, this type of convergent rib construction is not confined to use on the particular type of vane described but is adaptable to any suitable type of abrasive throwing vane and to any suitable type of throwing wheel.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. An abrasive throwing vane comprising a blade having an inner end for receiving abrasive particles, an outer end for discharging the particles, a front throwing face, and a rear face, said front throwing face being provided with a rib device extending lengthwise of the front face and up to the outer end of the blade, said rib device having particle guide walls diverging away from each other as they approach said outer end of the blade to divert the discharging particles into a plurality of diverging streams.

2. The throwing vane of claim 1 wherein there are two divergent rib portions.

3. An abrasive throwing vane comprising a base adapted to be connected to the face of the runner head of a throwing wheel and a blade having one longitudinal edge connected to said base, an oppositely-positioned free longitudinal edge, an inner end connecting said two longitudinal edges for receiving abrasive particles and an outer end opposite the inner end connecting said two longitudinal edges for discharging the abrasive particles, said blade having a front throwing face for engaging the received particles and throwing them out the outer end, and a rear face opposite the front face, said front throwing face being provided with a rib device extending longitudinally from the inner end to the outer end, said rib device comprising a pair of divergent rib portions at said outer end, said rib portions converging toward each other from said outer end to merge with a unitary rib portion toward said inner end.

4. The throwing vane of claim 3 wherein a longitudinal rib extends along said free longitudinal edge of said blade on said front throwing face.

5. The abrasive throwing vane of claim 3 wherein said convergent rib portions merge with said unitary rib portion at approximately the median portion of said blade.

6. An abrasive throwing wheel comprising a runner head mounted for rotation around a hub which includes a feed cage, an impeller in said feed cage rotatable with said runner head, means to feed abrasive particles into said cage, an opening in the peripheral surface of said cage, a plurality of throwing vanes mounted on one face of said runner head and rotatable around said cage, and each of said vanes having a blade provided with a throwing surface upon which is formed a rib device having a unitary apex portion adjacent the radially inner end of the blade and a pair of divergent spreader portions at the radially outer end of the blade, said rib device being gradually tapered outwardly from said apex portion to said spreader portions to cause particles picked up by the inner ends to be thrown out the outer ends in diverging streams.

7. The abrasive throwing wheel of claim 6 wherein said vanes each include a base connected to said blade, the base and runner head face provide a marginal guide for the thrown abrasive, and the blade edge opposite the base provides another marginal guide.

8. The abrasive throwing wheel of claim 6 wherein the rib device tapers down to a very thin rib end at the inner end of each blade.

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