United States Patent

[11] **3,579,928**

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[54] **SELF-AIR COOLING ABRADING WHEEL**
4 Claims, 3 Drawing Figs.

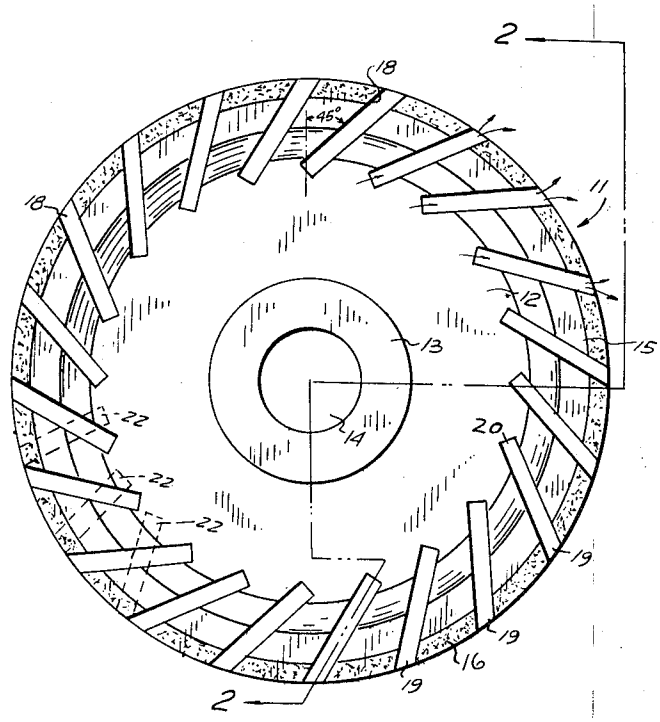
[52] **U.S. Cl.** **51/356,** 51/204
[51] **Int. Cl.** **B24b 55/02**
[50] **Field of Search** 51/356, 209, 204, 206, 206.4, 206.5

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ABSTRACT: A self-air cooling abrading wheel having a flat annular web and an axially enlarged annular rim with a peripheral abrading surface thereon, and with a first series of elongated angularly related slots formed in said rim around its periphery extending inwardly of the rim for a portion of its width, said slots having air inlets adjacent said web and outlets extending radially outward of said rim, and a second series of said angularly related slots extending inwardly from the other side of said web, the slots of the second series being alternated with the slots of the first series and independent thereof.



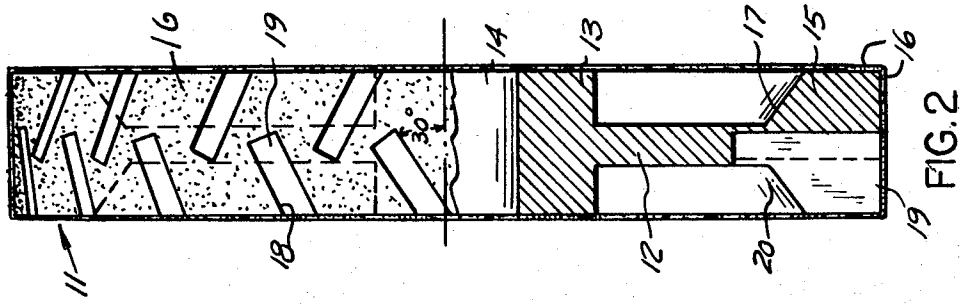


FIG. 2

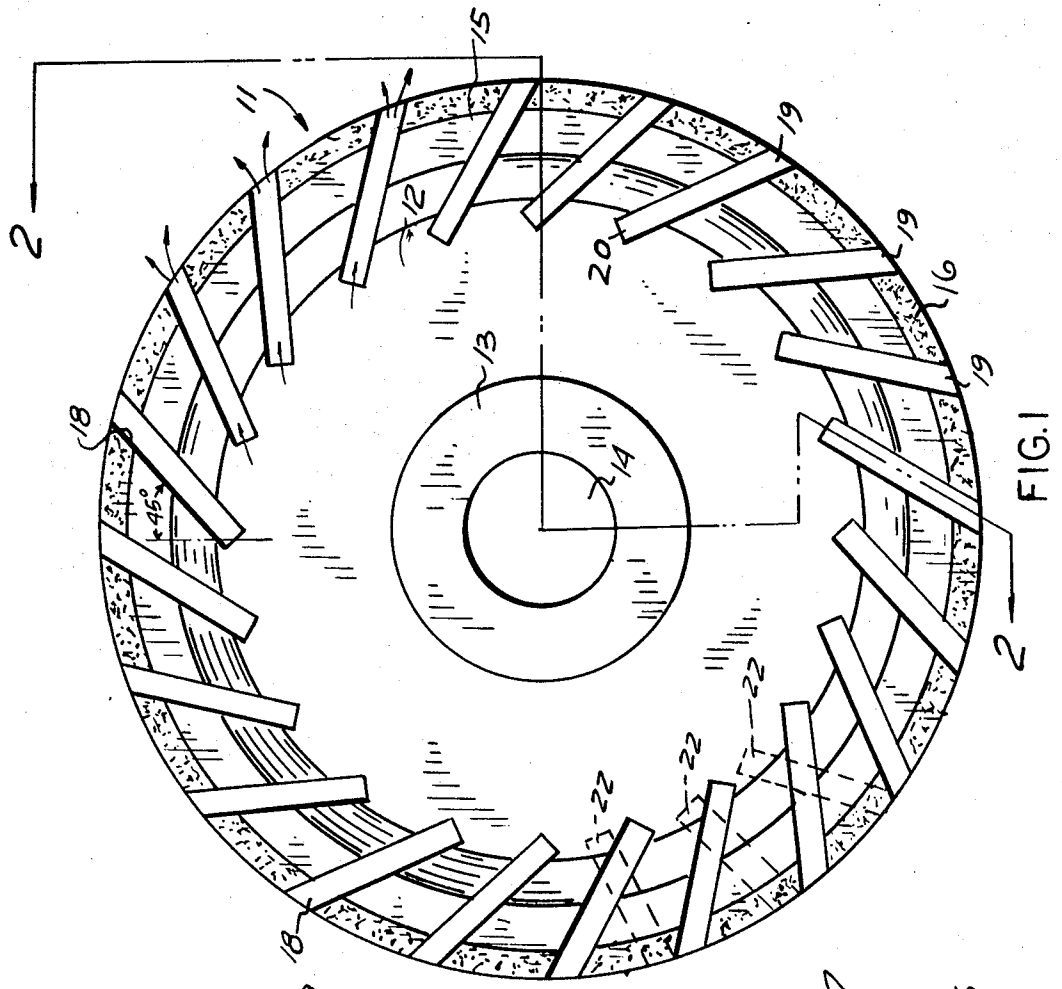


FIG. 1

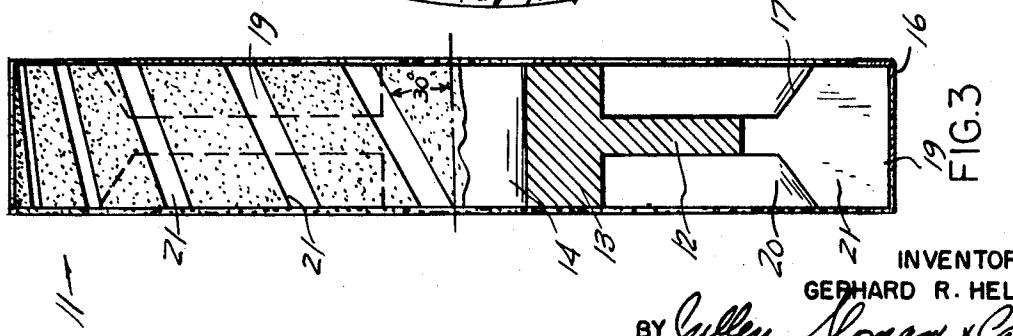


FIG. 3

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SELF-AIR COOLING ABRADING WHEEL

BACKGROUND OF THE INVENTION

In many grinding operations employing the present abrading wheel or related wheels, excessive friction developes with excessive heating unless some practical means is provided for effecting a cooling of the wheel, particularly at its peripheral surface portions.

Heretofore, various means have been employed for effecting such cooling such as the use of air jets or built-in attachments to the wheel itself by which air may be directed so as to flow over the outer peripheral edges of the wheel for cooling the same.

BRIEF DESCRIPTION OF THE INVENTION

The present invention has for its primary object the provision of a unit abrading wheel and wherein, means for effectively cooling the wheel in a self-air cooling operation are provided.

It is another object to provide in such abrading wheel within the rim thereof and extending from opposite faces of the rim, a series of elongated angularly related slots which project into the rim for a portion of its width which slots have air inlets adjacent the wheel web and have air outlets which terminate in the outer peripheral portion of the wheel to thus provide a continuous movement of air over and around and past peripheral portions of the wheel during the abrading operation.

It is another object of the present invention to provide spaced slots throughout the periphery of the abrading wheel at its rim projecting inwardly from the faces thereof on its opposite sides which slots have air inlets adjacent the wheel web and have outlets which terminate in the peripheral portions of the wheel and which slots extend only partially through the wheel to thus provide a continuous peripheral abrading surface.

These and other objects will be seen from the following specification and claims in conjunction with the appended drawing in which:

FIG. 1 is a side elevational view of the present abrading wheel.

FIG. 2 is a section taken in the direction of arrows 2–2 of FIG. 1.

FIG. 3 is similar to FIG. 2 showing a modification.

DETAILED DESCRIPTION

Referring to the drawing, the present abrading wheel is made of steel and is generally indicated at **11** and includes the flat annular web **12** of uniform thickness.

Said web includes hub **13** which is enlarged with respect to the web and projects axially outward from opposite sides thereof and is apertured at **14** adapted to receive the drive shaft for use in an abrading operation.

Said web terminates in the peripheral rim **15** which is provided with an outer peripheral carbide coating designated at **16**. Said carbide coating extends continuously over the outer axial portion of the wheel rim and the parallel radial portions as designated at **16**, FIG. **2**.

The carbide coating and the means for applying same is disclosed in my copending U.S. Pat. application, Ser. No. 804,511 filed Mar. 5, 1969 and entitled, PROCESS FOR APPLYING HARD CARBIDE PARTICLES UPON A SUBSTRATE.

The automatic air cooling of the present abrading wheel is achieved by applying to the opposite end faces of the rim a series of elongated angularly related slots which extend into the rim sides for a portion of the thickness of the rim.

These slots are shown at **18** as extending into the body of the rim and adjacent portions of the web **12**, FIG. **1**.

Each of the respective slots has an air inlet **20** adjacent said web and an elongated air outlet which extends through the outer peripheral portion of the rim, FIG. **2**, as at **19**.

A first series of said elongated angularly related slots is formed upon one side of the wheel rim as shown in FIG. **1**, and a second series of said angularly related slots **18** is formed into the rim from its opposite side as shown in FIG. **2**. At times it will become necessary to use one series of slots **21** only, cut from one side of the wheel rim to its opposite side as in FIG. **3**.

It is noted that the respective series of slots from the opposite sides of the rim overlap but are alternated and are not in communication with each other but extend throughout the wheel periphery. In some cases the slots **18**, **22** have to be so arranged that they are in communication at the web as indicated in dotted lines FIG. **1**.

In the illustrative embodiment of the invention the elongated slots **18** are arranged in an angle of approximately 45° with respect to a radial line which extends to the periphery of the wheel adjacent to said slots.

It is contemplated that this angle could be varied within the range of 0° to 60°, for illustration.

While under some conditions, the slot **18** may extend axially into the rim itself, it is contemplated that the said slots **18** extend at an acute angle with respect to the wheel axis such as best shown in FIG. **2**.

Here the preferred angle is 30° though it is contemplated that this angle could be varied within the range of 0° to 45° for illustration.

Size and the number of the respective grooves **18** will depend upon the dimensions of the wheel.

Best cooling effects are effected when the grooves are milled in on angles such as shown in FIG. **2**.

OPERATION

In operation on rotation on the present abrading wheel, air currents are created due to the use of the present slots **18**, said air flowing from the inlets **20** adjacent to web **12** through the said slots outwardly through the outlets **19** at the rim periphery, no matter in which direction the wheel is turning.

Cooling air moves by centrifugal force through the said elongated slots **18** from their inlets and their outlets and to some extent moves axially outward of the said slots to thus provide a swirling of cooling air around the complete peripheral portions of the rim where normally heating is most prevalent.

I claim:

1. In a monolithic abrading wheel;
the improvement comprising:
a series of notches on one annular edge defining the intersection of the abrading wheel face and the wheel side;
the notches opening to both the face and the side;
each notch being of considerable cross length, across the face, at least approximately halfway;
and of considerable side length, measured on the side towards the axis of the wheel; with the side length being greater than the cross length;
whereby, on wheel rotation, each notch will serve as an air-scoop to scoop air from the atmosphere at the side of the wheel, into the side part of the notch, and outlet it to the face of the wheel, out from the face part of the notch.

2. A wheel according to claim **1** wherein the side part of each notch extends from the face towards the axis on a non-radial line.

3. A wheel according to claim **1** wherein there is a similar series of notches on the other annular edge of the wheel, with the two sets of notches being relatively staggered.

4. A wheel according to claim **2** wherein there is a similar series of notches on the other annular edge of the wheel, with the two sets of notches being relatively staggered.