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Oswald

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[54] **GRINDING WHEEL FOR FLOOR GRINDING MACHINE**

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[52] **U.S. Cl.** ..... **51/209 R**
[51] **Int. Cl.** **B24d 7/06**
[58] **Field of Search** ..... 51/209 R, 204

[56] **References Cited**

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3,121,982	2/1964	Miller	51/209 R
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Primary Examiner—Donald G. Kelly
Assistant Examiner—Howard N. Goldberg
Attorney—Alan K. Roberts et al.

[57] **ABSTRACT**

A flat steel wheel is provided for a floor grinding machine. The wheel which is provided with a group of regularly distributed diamond matrices is further provided with a group of regularly distributed tungsten carbide buttons, which protrude from the wheel to a lesser extent than the diamond matrices and, provide for evening the wear of the matrices should one matrix tend to wear more rapidly than another. Instead of the flat wheel, a spider can be used in which abrasive elements are replaceably mounted. Carbide buttons are located on the spider to prevent wear and destruction of the same.

12 Claims, 5 Drawing Figures

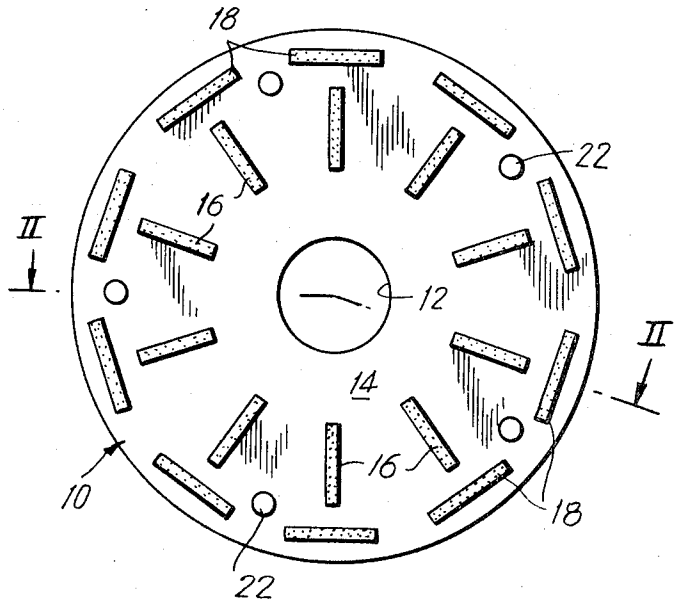


FIG. 1

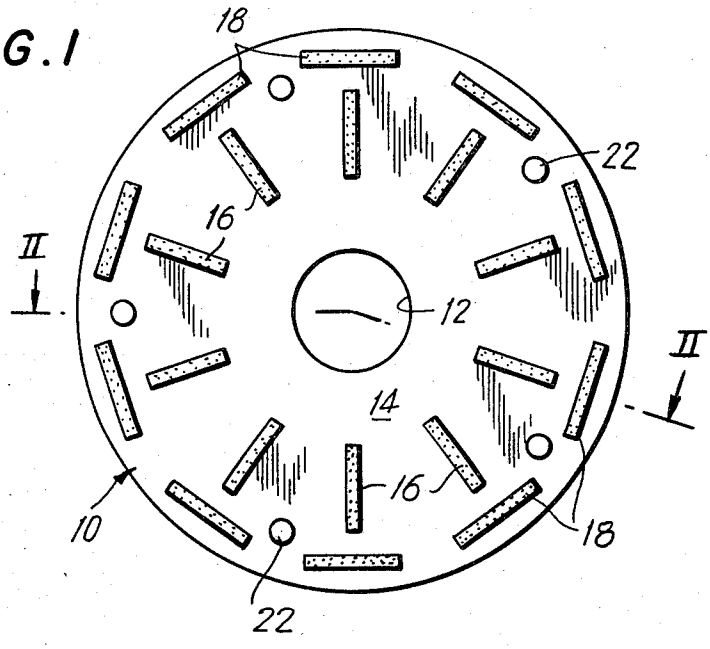


FIG. 2

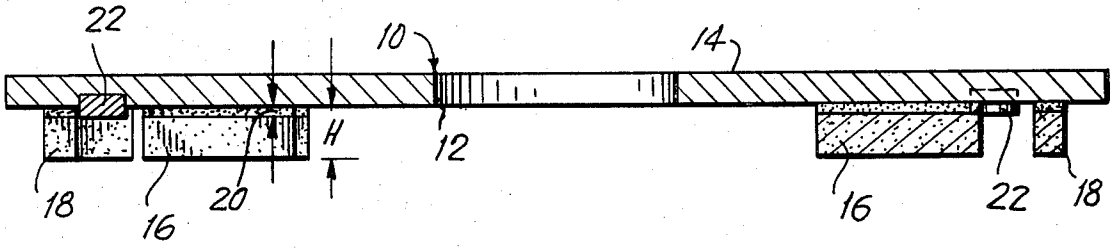


FIG. 3

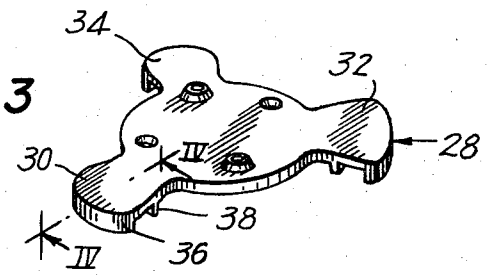


FIG. 4

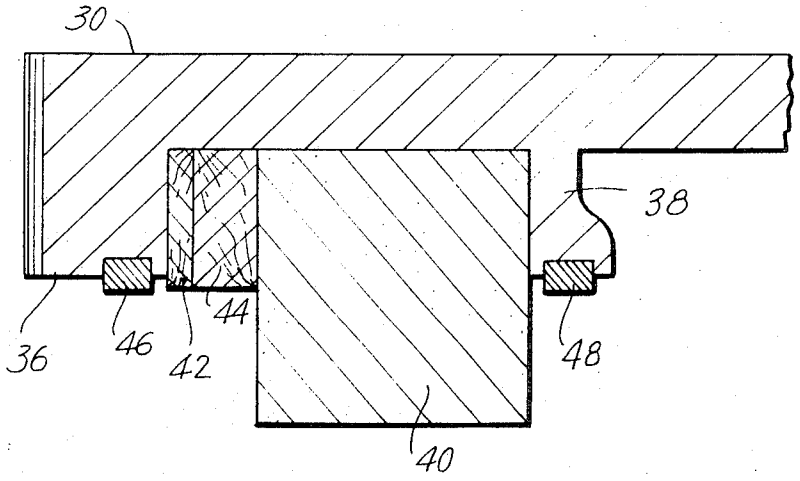
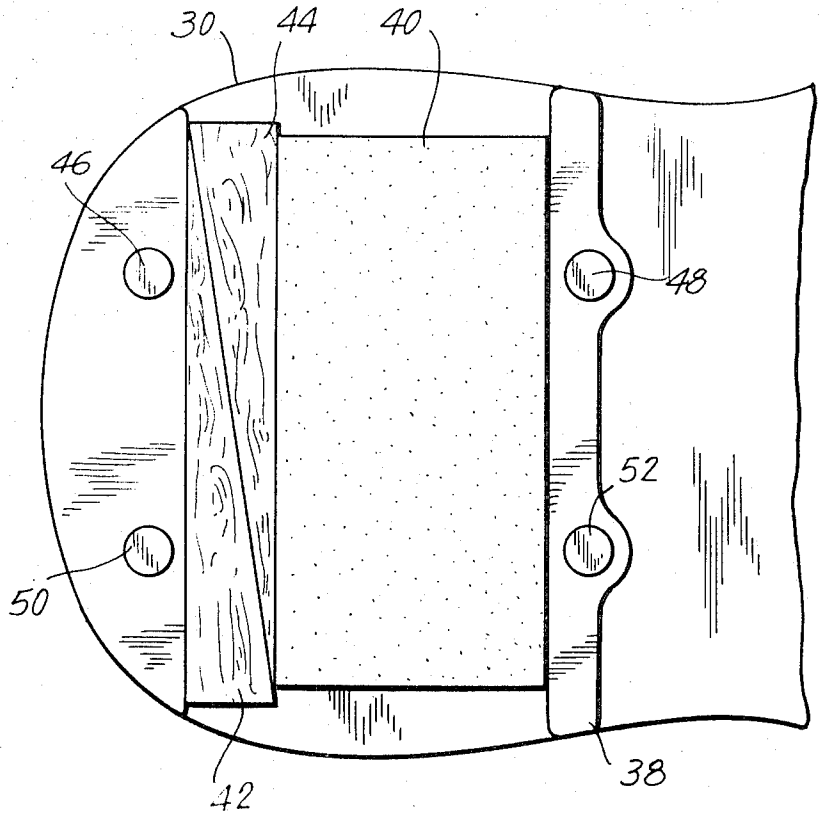


FIG. 5



GRINDING WHEEL FOR FLOOR GRINDING MACHINE

FIELD OF THE INVENTION

This invention relates to floor grinding apparatus and more particularly, to grinding wheels for floor grinding machines.

BACKGROUND

In U.S. Pat. No. 3,496,681, which issued Feb. 24, 1970, I have disclosed a floor grinding machine particularly adapted for grinding terrazzo floors.

As noted in said patent, terrazzo floors are initially formed from poured concrete containing small marble chips which, after being poured and set, must first be rough ground and then polished in order to flatten the same and obtain the characteristic terrazzo appearance.

It is known that terrazzo floor grinding machines have previously utilized diamond containing abrasive blocks, which grind at a relatively rapid rate and are relatively long wearing. It is also known that these diamond blocks can be provided in the form of diamond chips suspended in a matrix of sintered metals.

Even though the best shop practices may be employed, the manufacturers of diamond wheels cannot produce a uniform distribution of diamond chips throughout each matrix, without involving prohibitive expenses. As a result, when these diamond matrices are distributed around a supporting wheel, one side of the wheel will have more diamond chips exposed in their respective matrix then at the other side of the wheel. This has the result of making the more exposed side more wear resistant and this results in an uneven wear of the wheel. As a consequence, one side of the wheel is worn down to the supporting steel plate while the other side still has diamond chips left, which have not been used and which as a consequence, are wasted.

SUMMARY OF THE INVENTION

It is an object of the invention to provide for the optimum utilization of a grinding material employed in a grinding device which is especially suitable for concrete and terrazzo floors and the like.

It is another object of the invention to provide for the even wearing of diamond matrices or abrasive blocks in floor grinding machines.

It is still another object of the invention to provide generally for the utilization of all diamond chips in a diamond matrix, which is affixed to a grinding wheel.

In achieving the above and other objects of the invention, there is provided a grinding device comprising a support with grinding means being mounted on the support and wear resistant means being distributed between the grinding means and being spaced from one another to assure an evening off of the grinding means, should a part thereof tend to wear faster than another part thereof. Said grinding means, prior to wear, extends a greater distance from the support than the wear resistant means, said wear resistant means having a greater resistance to deterioration due to grinding than said grinding means.

According to a feature of the invention, the aforenoted grinding means includes spaced diamond matrices or abrasive blocks.

According to another feature of the invention, the wear resistant means are carbide buttons and, particularly, tungsten carbide buttons.

The aforesaid support may be a circular steel wheel having a generally flat face to which said matrices and buttons are fixed. These matrices may preferably be elongated members which are regularly distributed on the aforenoted face of the steel plate in radial and circumferential attitudes.

According to a still further feature of the invention, the aforesaid buttons may be regularly distributed on the abovenoted face of the steel wheel on an imaginary circle, which is concentric with the wheel.

According to yet another feature of the invention, the matrices have a generally common initial height of which portion, adjacent the support, is devoid of diamonds, said buttons having a height corresponding to said portion.

The support may be provided with bores in which these the aforesaid buttons are located, said buttons preferably having a brazed connection with the support.

It will be noted that according to a further embodiment of the invention, the support wheel is provided with a central mounting opening.

Other objects and features of the invention will be found in the following detailed description taken in conjunction with the accompanying drawing in which:

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a bottom view of a grinding wheel provided in accordance with the invention;

FIG. 2 is a cross-sectional view taken through lines II—II of FIG. 1;

FIG. 3 is a perspective view of a spider which can be used instead of the wheel of FIG. 1;

FIG. 4 is a cross-sectional view along line IV—IV of FIG. 3 with an abrading element installed; and

FIG. 5 is a bottom view of the portion illustrated in FIG. 4.

DETAILED DESCRIPTION

In my earlier U.S. Pat. No. 3,496,681, I have illustrated and disclosed a floor grinding device comprising a wheeled carriage adapted to be rolled along a floor to be ground, with a vertical rotatable drive shaft mounted on this carriage for limited axial movement. A means is provided axially urging the shaft downwardly with a resilient force, this means comprising an axially slidable bearing sleeve having bearings secured thereto in which said drive shaft is rotatably mounted. A resilient mechanism urges the sleeve downwardly and means are provided for externally adjusting the resilient mechanism.

I have further disclosed in said patent, a universal joint with grinding means mounted by this universal joint at the end of the shaft for grinding engagement with a floor. A means is provided for rotating the shaft and further a means is provided for raising the grinding means to a position out of this grinding engagement.

The present invention is intended to provide superior grinding wheels for the above-noted machine, as well as for many and other varied type of machines, it being clear that the present invention is not limited to any specific floor grinding machine with which the wheel need necessarily be employed.

In FIGS. 1 and 2 is illustrated a circular wheel **10** having a central opening **12** provided for mounting purposes. The lower surface of the wheel is indicated at **14** and is a generally flat face upon which are mounted a plurality of diamond matrices. These diamond matrices are rectangular pieces approximately, for example, one-quarter of an inch by one-quarter of an inch by two inches in length. They are made of diamond chips conventionally suspended in a matrix of sintered metals. One group of such matrices is indicated at **16,** which group includes the radially disposed matrices which are regularly spaced about the axis of the wheel. The second group is generally indicated at **18** which includes a plurality of matrices generally disposed in circumferential attitudes concentric with the axis of the wheel.

In the preferred embodiment of the invention, the matrices **16** are disposed at right angles to the matrices **18** and are arranged in a general T-shaped configuration. Various other configurations are also possible and the invention is not limited to the illustrated disposition of the aforedisclosed matrices.

The wheel **10** is, as noted above, a circular steel plate. It may be, for example, approximately one-quarter of an inch thick, although other thicknesses are possible within the scope of the invention, provided that the plate is provided with adequate strength. The wheel may be, further, 10 to 12 inches in diameter although other diameters are also possible in accordance with the machine in which the wheels are to be placed. The aforenoted segments **16** and **18** are brazed to the surface in the illustrated positions.

As has been noted hereinabove, while using the best shop practices, the diamond wheel manufacturers cannot produce a uniform distribution of diamond chips throughout each segment. As a result, the matrices at one side of the wheel will have more diamond chips exposed than at another side of the wheel. This makes the heavily exposed side more wear resistant than the other and results in an uneven wear of the wheel. As a consequence, that side of the wheel which is less wear resistant will be worn down to the steel plate, while the other side still has good and utilizable diamond chips remaining which, however, are wasted.

With reference to FIG. 2, it is seen that the matrices such as, for example, the matrix **16,** has a height H. Of this height, a smaller portion **20** adjacent the face of the wheel is devoid of diamond chips and all of the diamond chips of each matrix are in the other portion of the matrix. This has a relationship to the invention to be explained hereinafter.

To avoid the uneven wear noted hereinabove or to minimize the consequences thereof, a plurality of tungsten carbide buttons **22** are regularly distributed about the support **10** and in the illustration are located on an imaginary circle concentric with the axis of the wheel. These buttons are accommodated in bores provided in the steel wheel and have a brazed connection with the wheel. The buttons extend out of the wheel to a height corresponding to that of the protion **20** mentioned hereinabove.

As a result of the provision of the tungsten carbide buttons, when one side of the wheel **10** wears to a certain extent, indicated by the portion **20,** the buttons prevent additional wear and this wear is taken up by the remaining portion of the grinding wheel so that the remaining matrices are worn down to their fullest extent, whereby the use of the same is optimized.

It will be seen from the above that the invention achieves the objectives of making optimum use of grinding wheels and particularly diamond matrices located thereon. This is accomplished by providing generally a grinding device which comprises a support with grinding means mounted thereon and wear resistant means distributed within the grinding means and being spaced from one another to assure an evening off of the grinding means, should a part thereof tend to wear faster than another part thereof. Said grinding means, prior to wear, extends a greater distance from the support than said wear resistant means. Said wear resistant means has a greater resistance to deterioration due to grinding than said grinding means.

While a flat wheel has been referred to above, the invention is useful with other types of "wheels" such as the spider **28** shown in FIGS. **3-5.** This spider which is in major part conventional includes, for example, three lobes **30, 32** and **34** in which grinding blocks are detachably fastened. These lobes are similarly shaped, lobe **30** having, for example, depending lips **36** and **38** between which is accommodated an abrasive stone or block **40.** This stone is held in position, for example, by wooden wedges **42** and **44.**

From the description of the first embodiment, it will now be understood that, when stone **40** wears down to the edges of lips **36** and **38,** these lips will start to wear in the absence of the provisions of the invention. This, in turn, would ultimately require the costly and time consuming replacement of the spider. All of this is, however, avoided by brazing, to the spider, tungsten carbide buttons **46, 48, 50** and **52** on each lobe, said buttons being more wear resistant than the abrasive blocks and serving to warn the operator that the abrasive blocks have worn down, as well as to protect the spider. Accordingly, it is seen that the invention has a wide variety of applications.

There will now be obvious to those skilled in the art many modifications and variations of the construction set forth hereinabove. Such modifications and variations will not, however, depart from the scope of the invention, if defined by the following claims.

What is claimed is:

1. A grinding device comprising a support, a plurality of grinding means mounted on said support, and wear resistant means on said support and distributed among said grinding means, said wear resistant means having a greater resistance to deterioration due to grinding than said grinding means, said grinding means and wear resistant means extending at least generally in the same direction from said support and being of different heights prior to deterioration of said grinding means.

2. A device as claimed in claim **1** wherein said grinding means includes spaced diamond matrices.

3. A device as claimed in claim **2** wherein said wear resistant means are carbide buttons.

4. A device as claimed in claim **3** wherein said support is a circular steel wheel having a generally flat face to which said matrices and buttons are affixed.

5. A device as claimed in claim **4** wherein said matrices are elongated mambers which are regularly distributed on said face in radial and circumferential attitudes.

6. A device as claimed in claim **5** wherein said buttons are regularly distributed on said face on an imaginary circle concentric with said wheel.

7. A device as claimed in claim 3 wherein said matrices have a generally common initial height of which a portion, adjacent the support, is devoid of diamonds, said buttons having a height corresponding to said portion.

8. A device as claimed in claim 3 wherein the support is provided with bores in which said buttons are located, said buttons having a brazed connection with said support.

9. A device as claimed in claim 3 wherein the buttons are tungsten carbide buttons.

10. A device as claimed in claim 4 wherein said wheel is provided with a central mounting opening.

11. A device as claimed in claim 1 wherein said support is a spider including pairs of spaced depending lips, abrasive blocks between the lips of each said pair, and carbide buttons on the bottom of the lips.

12. A device as claimed in claim 11 wherein the blocks before wearing extend below said buttons.

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