

UNITED STATES PATENT OFFICE

MINER L. HARTMANN, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO THE CARBORUNDUM COMPANY, OF NIAGARA FALLS, NEW YORK, A CORPORATION OF PENNSYLVANIA

ABRASIVE ARTICLE

No Drawing.

Application filed July 3, 1926. Serial No. 120,527.

This invention relates to an improvement in the manufacture of abrasive articles and consists in producing a self-dressing wheel and the control of the undesirable quality known as "glazing".

Abrasive wheels are, in general, made from graded abrasive grains (for example silicon carbide, fused alumina and the like) mixed with ceramic bonding materials, such as kaolin and feldspar, moistened with water, formed into the desired shape, dried and burned in a ceramic kiln. It has been the practice in the past to control the porosity or apparent density of the grinding wheel by means of pressure applied during the forming, or by some other change in the manner of forming the wheel, or possibly by the addition of organic materials which burn out, leaving pore spaces. For certain types of grinding it is essential that the grinding face be kept open and sharp and that it does not become coated with a thin layer of metal or other material which is being abraded. It is, of course, well known that an abrasive wheel in operation is itself worn down, although at a much slower rate than the material being abraded.

Some abrasive wheels tend to wear down to a fairly smooth surface at the grinding face. The object of my invention is to prevent this smoothing of the cutting face of the wheel, or other abrasive article, and instead to cause the surface to remain rough, open cutting and irregular on the surface in order that better abrasive action may be attained so that the wheel or other abrasive article becomes self-dressing. I have discovered that I may accomplish this purpose by adding comparatively weak non-abrasive particles of the size approximately equal to the principal abrasive grain size. These weak particles are then quickly broken out during the grinding action and leave holes or depressions over the grinding face, and, if a sufficient quantity is used, gives an open, sharp cutting grinding surface, which is much desired. I have found various materials which may be used for this purpose. For example calcined clay, commonly known as grog, graded to grain sizes is very satisfactory. I may also use a porous

clay grog material such as that produced, for example, by calcining a mixture of clay and powdered wood. Particles of diatomaceous earth, porous alumina, corundum, flint, magnesia, glass, and the like, may also be used, and in fact grains of any material which during the grinding breaks (comparatively) easily, leaving holes or depressions in the grinding surface.

As a specific illustration of my invention, I may take 80 parts by weight of 16 mesh fused aluminous abrasive. To this I add 5% of 16 mesh calcined clay grog particles, 10% of high purity kaolin and 5% of feldspar. These ingredients are thoroughly mixed, moistened with water, pressed to the desired shape, dried and burned to a temperature of about 1300° C. in the usual manner well known to the art. The product resulting contains a sufficient number of the soft, non-abrasive particles so that when the wheel is used for grinding these soft particles are readily broken out leaving the much desired irregular, cool and fast cutting abrasive face. The abrasive particles herein employed have a hardness 9 or more on Mohs' scale while the non-abrasive particles have a hardness below 9. Any particles of a granular nature will render the wheel self-dressing if they are more friable than the abrasive grains and yet firm enough to break out of the bonded mass without glazing the surface of the article, or if they do not form as firm a union with the bond as do the abrasive particles.

While I have described one specific example of a suitable dressing grain for use in my invention, I do not limit it to this particular material, but may use particles of any inorganic material which when added in grain form with abrasive grains in a fabricated abrasive article are more easily broken out during the grinding process than are the abrasive particles to produce an irregular and sharp grinding surface and render the article a self-dressing or non-glazing article. Furthermore, my invention is not restricted to the formation of articles having a ceramic bond, as it is equally applicable to articles bonded with other agents, such as synthetic resins, cement, rubber, shellac, glue, etc., and

the invention can be applied to abrasive stones of various forms as well as wheels, and to other abrasive articles, as abrasive paper and cloth, discs, and the like.

5 I claim:

1. A self-dressing abrasive article whose abrading surface is adapted to be moved relatively to any article being ground, the article comprising a bonded mass of abrasive
10 grains, which abrasive grains have a hardness of at least 9 on Mohs' scale, together with friable grains less hard than the abrasive grains and of a hardness less than 9 on Mohs' scale but sufficiently hard to break out of the
15 mass without glazing the surface of the abrasive article.

2. A self-dressing abrasive article whose abrading surface is adapted to be moved relatively to any article being ground comprising
20 a bonded mass of abrasive grains having friable grains of calcined clay grog dispersed therethrough and adapted to break out of the mass more readily than the abrasive particles.

3. A self-dressing abrasive article whose abrading surface is adapted to be moved relatively to any article being ground comprising a mass of abrasive grains and friable dressing grains of substantially uniform mesh, and a
30 bond, said dressing grains being of such a nature that they may be more readily broken out of the mass than the abrasive grains, the abrasive grains being largely in excess of the dressing grains and constituting more than
35 80 percent of the total mass of grains.

In testimony whereof I have hereunto set my hand.

MINER L. HARTMANN.

40

45

50

55

60

65