FORM 2

THE PATENTS ACT, 1970
(39 of 1970)
AND
THE PATENTS RULES, 2003

COMPLETE SPECIFICATION

(See Section 10; rule 13)

TITLE OF THE INVENTION

"COMPOSITE ABRASIVE WHEEL"

APPLICANT

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The following specification particularly describes
the invention and the manner in which
it is to be performed

What is claimed is:

1. A composite abrasive wheel comprising:

a primary abrasive portion defining a front surface, wherein the primary abrasive portion comprises shaped ceramic abrasive particles retained in a first organic binder;

a secondary abrasive portion defining a back surface opposite the front surface, wherein the secondary abrasive portion is bonded to the primary abrasive portion, wherein the secondary abrasive portion comprises secondary crushed abrasive particles retained in a second organic binder, wherein the primary abrasive portion comprises a larger volume percentage of the shaped ceramic abrasive particles than the secondary abrasive portion; and

wherein the composite abrasive wheel has a central aperture therein that extends from the front surface to the back surface.

2. The composite abrasive wheel of claim 1, wherein the secondary abrasive portion is substantially free of the shaped ceramic abrasive particles.

3. The composite abrasive wheel of claim 1 or 2, wherein the shaped ceramic abrasive particles comprise truncated triangular pyramids.

4. The composite abrasive wheel of claim 3, wherein the truncated triangular pyramids have a slope angle in a range of from 75 to 85 degrees.

5. The composite abrasive wheel of any one of claims 1 to 4, wherein the primary abrasive portion further comprises diluent crushed abrasive particles.

6. The composite abrasive wheel of claim 5, wherein the diluent crushed abrasive particles have a smaller mean particle size than the shaped ceramic abrasive particles.

7. The composite abrasive wheel of any one of claims 1 to 6, wherein the first organic binder and the second organic binder are different.

8. The composite abrasive wheel of any one of claims 1 to 7, wherein the shaped ceramic abrasive particles have a ratio of maximum length to thickness of from 1:1 to 8:1.

9. The composite abrasive wheel of any one of claims 1 to 7, wherein the shaped ceramic abrasive particles have a ratio of maximum length to thickness of from 2:1 to 5:1.

10. The composite abrasive wheel of any one of claims 1 to 9, wherein the shaped ceramic abrasive particles comprise sol-gel-derived shaped alumina abrasive particles.

11. The composite abrasive wheel of any one of claims 1 to 10, wherein the shaped ceramic abrasive particles have a coating of inorganic particles thereon.

12. The composite abrasive wheel of claim of any one of claims 1 to 11, wherein the primary abrasive portion further comprises a first reinforcing fabric adjacent the front surface, and wherein the secondary abrasive portion further comprises a second reinforcing fabric adjacent the back surface of the secondary abrasive portion.

13. The composite abrasive wheel of any one of claims 1 to 12, wherein the composite abrasive wheel has a depressed center portion encircling the central aperture.

14. The composite abrasive wheel of any one of claims 1 to 13, wherein on a total weight basis, the primary abrasive portion comprises from 66 to 74 percent by weight of shaped alumina abrasive particles, from 14 to 20 percent by weight of an organic binder derived from a liquid phenolic resin and a solid phenolic resin, and 10 to 15 percent by weight of grinding aid particles.

15. The composite abrasive wheel of any one of claims 1 to 14, wherein at least one of the first or second binder comprises an at least partially cured phenolic resin.

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