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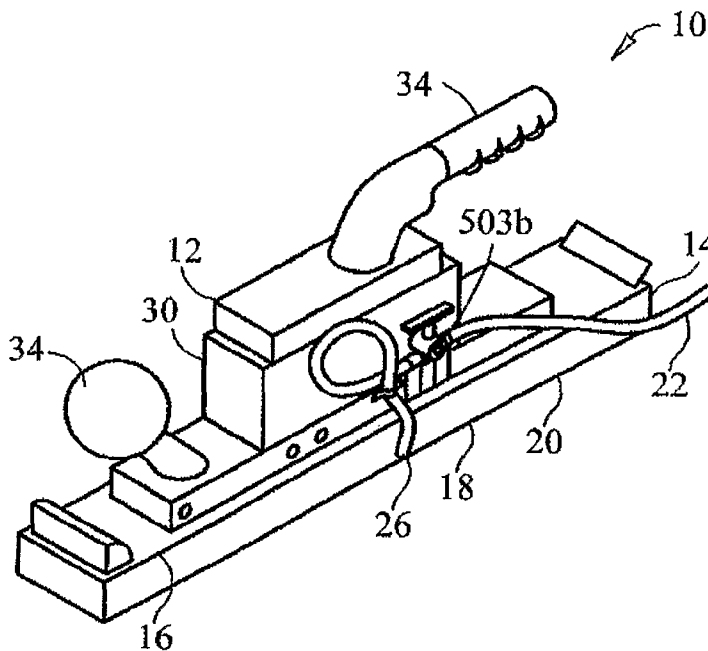
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(54) Title: POLISHING DEVICE FOR STONE AND OTHER HARD MATERIALS



(57) Abstract: The present invention is directed to a portable polishing device for stone or other hard materials. The polishing device includes a motorized sander and a polishing block attached to the sander. The polishing block comprises an abrasive surface which is shaped to fit the profile of an edge or surface to be polished or sanded.

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**POLISHING DEVICE FOR STONE AND  
OTHER HARD MATERIALS**

## **BACKGROUND OF THE INVENTION**

### 1. Technical Field

This invention relates to power driven tools, and more particularly, to a device for  
5 polishing or abrading a stone surface.

### 2. Description of Related Art

Power driven tools are used to perform many different functions, including sanding,  
polishing and stripping. One of the most popular types of these tools is the power driven  
10 sander or polisher. These sander/polisher devices are typically powered by pressurized air  
and comprise a suitable working surface for abrading or polishing a material. The tools  
typically include a motor and drive assembly that rotate or oscillate upon the working  
surface at a high velocity. Although these devices have proven useful for polishing or  
abrading relatively flat surfaces, they are not effective and are difficult to use on contoured  
15 surfaces. Accordingly, a need exists for a power driven polishing/sanding device that is  
lightweight, easy to use and effective in polishing or sanding contoured surfaces.

## SUMMARY OF INVENTION

The present invention solves the above-described problem by providing a polishing device having an abrasive surface specifically designed for polishing or sanding contoured surfaces as well as flat surfaces. The polishing device of the present invention includes a motorized sander and a polishing block attached to the sander. The polishing block comprises an abrasive surface, and the polishing block and abrasive surface are shaped to fit the profile of an edge or surface to be polished and/or sanded.

More particularly, the polishing block is comprised of aluminum, rubber, wood, plastic or other like material and the abrasive surface is comprised of a hard abrading surface such as synthetic diamonds. The polishing block and abrasive surface may be shaped to fit a contoured or flat edge or surface, including a demi-bullnose, full bullnose, ogee, triple waterfall or flat polish profile. Typically, the abrasive surface is a 50, 100, 200, 400, 800, 1500, 3000 or other common grit surface.

In addition, the polishing device is portable. Preferably, the motorized sander is a commercially available straight line air sander or orbital air sander. The polishing device preferably includes a water outlet for providing water to the abrasive surface during operation. The polishing device may be used on a variety of surfaces including, but not limited to, stone, wood, fiberglass, quartz, cement, concrete, porcelain, ceramic, or acrylic.

The device of the present invention is especially useful for polishing granite.

Other features and advantages of the present invention will become apparent upon reading the following detailed description of embodiments of the invention, when taken in conjunction with the appended claims.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further  
5 objectives and advantages thereof, will be best understood by reference to the following detailed description of illustrative embodiments when read in conjunction with the accompanying drawings, wherein

**Figure 1** is a perspective view of a polishing device made in accordance with an embodiment of the present invention;

10 **Figures 2a-2f** are side views of edge and surface profiles of the polishing device of the present invention; and

**Figure 3** is a perspective view of a polishing device made in accordance with an alternative embodiment of the present invention.

## DETAILED DESCRIPTION OF THE INVENTION

In the descriptions that follow, like parts are marked throughout the specification and drawings with the same numerals, respectively. The drawing figures are not necessarily drawn to scale and certain figures may be shown in exaggerated or generalized form in the interest of clarity and conciseness.

Referring to **Figure 1**, shown is polishing device **10** comprising motorized sander **12** and polishing block **14** attached to base **16** of sander **12**. Polishing block **14** includes abrasive surface **18** located on working surface **20** of polishing block **14** for sanding or polishing an item having a flat or contoured surface. Polishing block **14** may be comprised of any suitable material including, but not limited to aluminum, rubber, wood, or plastic. Preferably, polishing block **14** is comprised of a durable material such as aluminum, rubber, or plastic. Polishing block **14** may be attached to sander **12** via any means capable of maintaining polishing block **14** against sander **12** in a securely fastened position during use. For example, polishing block **14** may be attached to sander **12** via bolts, screws, wing nuts, or other similar fastening means. Preferably, polishing block **14** is attached to sander **12** via wing nuts such that polishing block **14** may be easily detached from sander **12**, wherein a second polishing block having a different abrasive surface **18** or profile may be attached to the sander for subsequent use.

Polishing block **14** preferably has a length not greater than about 15 of the length of sander base **16**. In addition, polishing block **14** preferably has a width not greater than about 3 inches of the width of sander base **16**. In one embodiment, as shown in **Figure 1**,

the length and width of polishing block 14 is equal to the length and width, respectively, of sander base 16.

The thickness, or height, of polishing block 14 is preferably between about 1/8 of an inch and about 2 1/2 inches. More desirably, the thickness of the polishing block 14 is  
5 between about 1 1/2 inches and about 1 3/4 inches.

Any abrasive surface 18 known to those having skill in the art, and useful for polishing and sanding, may be used in the present invention. For example, abrasive surface 18 may be comprised of a resin with abrasive particles embedded therein. Abrasive  
10 particles useful in the present invention include, but are not limited to particles comprising natural or synthetic diamonds, aluminum oxide, silicon carbide, alumina zirconia, iron oxide, ceria, cubic boron nitride, garnet and combinations thereof. Preferably, abrasive surface 18 is comprised of a resin with synthetic diamond particles embedded therein. More preferably, abrasive surface 18 is comprised of synthetic diamond polishing pads which are attached to working surface 20 of polishing block 14 with an adhesive such as  
15 glue.

Abrasive surface 18 may range from a very coarse to a very fine grit surface. Desirably, during operation of polishing device 10, the edge or surface of a material should be sanded and/or polished with a series of polishing blocks, each having progressively finer grit surfaces in the following order: 50, 100, 200, 400, 800, 1500 and 3000.

20 Polishing block 14 and abrasive surface 18 are shaped to fit the profile of an edge or surface to be polished or sanded. As a result, polishing device 10 of the present invention provides effective and uniform polishing/sanding of contoured as well as flat surfaces. **Figure 2** illustrates examples of edge or surface profiles polishing block 14 and abrasive

surface **18** may be shaped to fit, and that polishing device **10** may be used on. These profiles include, but are not limited to, a demi bullnose (**Figure 2a**), full bullnose (**Figure 2b**), 2 cm ogee (**Figure 2c**), 3 cm ogee (**Figure 2d**), triple waterfall (**Figure 2e**) and flat polish (**Figure 2f**). It should be understood that the profiles illustrated in **Figure 2** are merely representative edge and surface profiles that polishing device **10** may be used on. Accordingly, polishing block **14** and abrasive surface **18** may be shaped to fit any edge or surface in addition to those identified in **Figure 2**.

Polishing device **10** preferably includes conduit **22** having a fluid inlet (not shown) and a fluid outlet **26**. A fluid may pass through conduit **22** and exit through outlet **26** to provide fluid to the abrasive surface **18**. The polishing device may also include valve **28** for controlling fluid flow through conduit **22**. The fluid aids in keeping abrasive surface **18** cool during operation of polishing device **10**, and also serves to wash away debris that is polished or sanded from a given surface. Preferably, fluid inlet **24** is attached to a water source such as a faucet, and water passes through conduit **22** and exits through fluid outlet **26**. Ideally, fluid outlet **26** is located on abrasive surface **18**. Conduit **22** may be attached to polishing device **10** by any means or device known to those skilled in the art, including but not limited to a clamp. Conduit **22** is preferably between about  $\frac{1}{4}$  inch to about  $\frac{3}{4}$  inch in diameter. More preferably, conduit **22** is about  $\frac{3}{8}$  inch in diameter.

Any motorized sander known to those having skill in the art may be used as motorized sander **12** in polishing device **10**. As illustrated in **Figures 1** and **3**, commercially available sanders **12** typically include housing **30** and one or more handles and/or palm grips **34** for directing the device. A motor (not shown) and drive assembly (not shown) are located within housing **30**, and operate to rotate or oscillate base **16** of



sander 12 at a high velocity. In the present invention, because polishing block 14 is attached to base 16 of sander 12, the motor and drive assembly operate to rotate or oscillate polishing block 14. Sander 12 may comprise an electric or pneumatic (air-powered) motor, though an air-powered sander is preferred in the present invention.

5 Polishing device 10 illustrated in Figure 1 comprises straight line sander 12, wherein base 16 and polishing block 14 move in a reciprocal action traveling back and forth in a straight line during operation. Polishing device 10 comprising straight line sander 12 produces long abrasive strokes and is useful for polishing or sanding large surfaces. A preferred commercially available straight line sander that has proven to work well in the present invention is the Hutchins Hustler Straightline Air Sander 2000 made by Hutchins  
10 Manufacturing Co., Pasadena, CA.

Figure 3 illustrates a polishing device comprising an orbital sander 12, wherein base 16 and polishing block 14 move in an orbital path during operation. Polishing device 10 comprising orbital sander 12 is particularly effective for polishing or sanding surfaces  
15 having a tight radius curve or difficult areas to access. A preferred commercially available orbital sander for use in the present invention, is the Jitterbug Air Orbital Sander made by Hutchins Manufacturing Co., Pasadena, CA.

Polishing device 10 of the present invention is useful for polishing or sanding a wide variety of materials including, but not limited to stone, wood, fiberglass, quartz, cement, concrete, porcelain, ceramic, or acrylic. Polishing device 10 is particularly useful  
20 for sanding or polishing stone, including granites, limestones (such as marble), shale (including slate), sandstones (including quartz), and basalts.

It should be understood that the foregoing relates to exemplary embodiments of the invention and that modifications may be made without departing from the spirit and scope of the invention as set forth in the following claims.

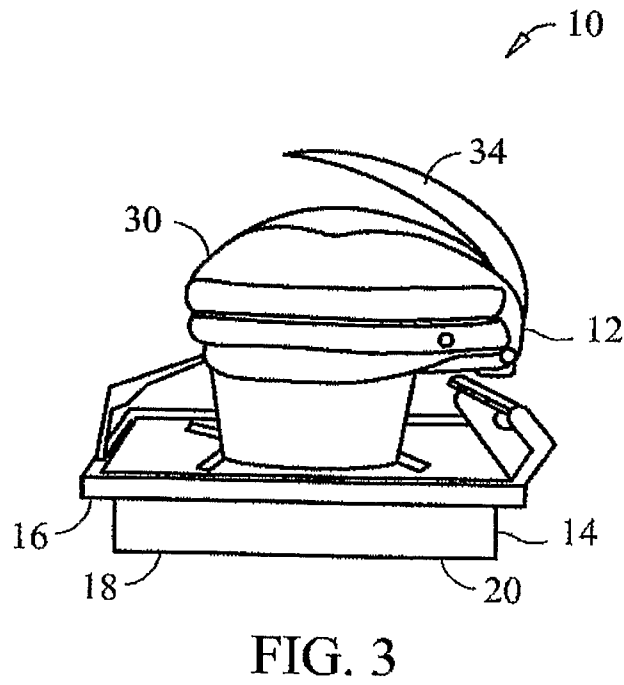
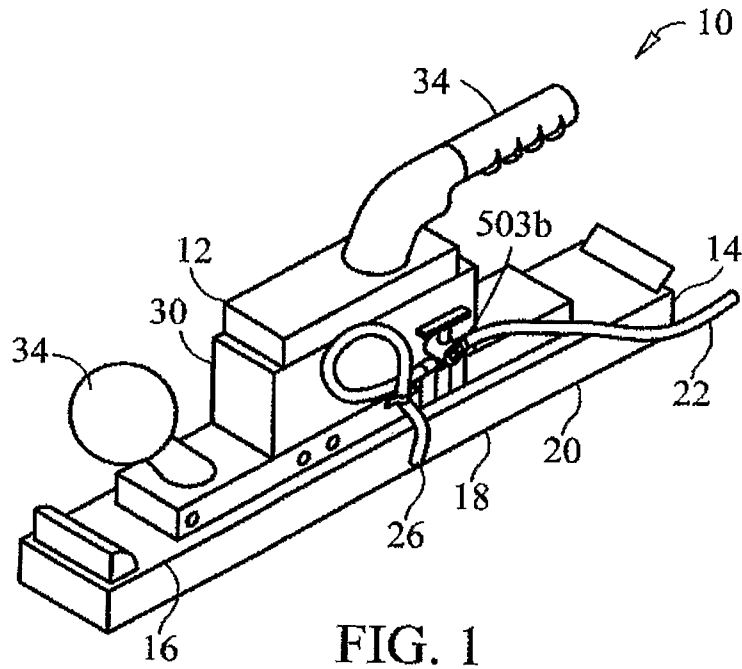
**CLAIMS:**

What is claimed is:

- 1 1. A polishing device comprising:  
2 a motorized sander; and  
3 a polishing block attached to the sander;  
4 the polishing block comprising an abrasive surface which is shaped to fit a  
5 profile of a surface to be polished or sanded.
  
- 1 2. The polishing device of Claim 1, wherein the polishing block is comprised of  
2 aluminum, rubber, or plastic.
  
- 1 3. The polishing device of Claim 1, wherein the abrasive surface is comprised of  
2 natural or synthetic diamonds, aluminum oxide, silicon carbide, alumina zirconia,  
3 iron oxide, ceria, cubic boron nitride, garnet or combinations thereof.
  
- 1 4. The polishing device of Claim 3, wherein the abrasive surface is comprised of  
2 synthetic diamonds.
  
- 1 5. The polishing device of Claim 1, wherein the abrasive surface is a 50, 100, 200,  
2 400, 800, 1500 or 3000 grit surface.

- 1 6. The polishing device of Claim 1, wherein the surface to be polished or sanded is a  
2 contoured surface.
- 1 7. The polishing device of Claim 1, wherein the surface to be polished or sanded has a  
2 demi bullnose, full bullnose, ogee, triple waterfall, or flat polish profile.
- 1 8. The polishing device of Claim 1, wherein the sander comprises a pneumatic or  
2 electric motor.
- 1 9. The polishing device of Claim 1, wherein the sander is a straight line air sander.
- 1 10. The polishing device of Claim 1, wherein the sander is an orbital air sander.
- 1 11. The polishing device of Claim 1, further comprising a water outlet for providing  
2 water to the abrasive surface.
- 1 12. The polishing device of Claim 11, wherein the water outlet is located on the  
2 abrasive surface.
- 1 13. The polishing device of Claim 1, wherein the surface to be polished or sanded is  
2 comprised of stone, wood, fiberglass, quartz, cement, concrete, porcelain, ceramic,  
3 or acrylic.

- 1 14. The polishing device of Claim 13, wherein the surface to be polished or sanded is  
2 comprised of granite.
- 1 15. The polishing device of Claim 1, wherein the device is portable.
- 1 16. A polishing device comprising:  
2 a motorized air sander; and  
3 a polishing block attached to the sander;  
4 the polishing block comprising an abrasive surface which is shaped to fit a  
5 profile of a contoured surface.
- 1 17. The polishing device of Claim 16, wherein the abrasive surface is comprised of  
\_2 synthetic diamonds.
- 1 18. The polishing device of Claim 16, wherein the contoured surface has a demi  
2 bullnose, full bullnose, ogee, triple waterfall, or flat polish profile.
- 1 19. The polishing device of Claim 16, wherein the sander is a straight line air sander.
- 1 20. The polishing device of Claim 16, wherein the sander is an orbital air sander.



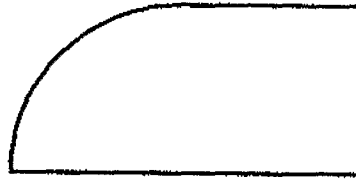


FIG. 2A



FIG. 2B

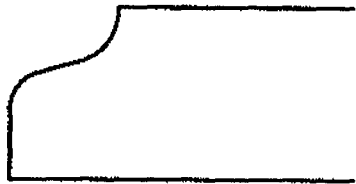


FIG. 2C

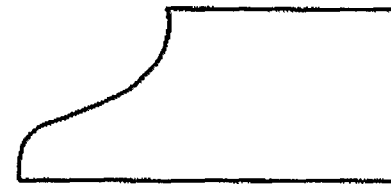


FIG. 2D



FIG. 2E



FIG. 2F

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/01493

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC: **B24B 41/00( 2006.01);B24D 17/00( 2006.01)**  
  
 USPC: **451/356,357,495**  
 According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**  
 Minimum documentation searched (classification system followed by classification symbols)  
 U.S. : 451/356, 357, 495  
  
 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
  
 Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
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**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3,339,494 A (LAUBER,E) 05 September 1967(05.09.1967), col. 6, lines 55-72.	1, 7-9, 11-16 and 18-19
X	US 6,220,948 B1 (CARBALLO) 24 April 2001(24.04.2004), col. 2, lines 63 through col. 3, line 11 and lines 27-29.	1, 2, 6-10, 13-16 and 18-20
X	US 6,887,139 B2 (JENNETTE) 03 May 2005(03.05.2005), col. 3, lines 56-57; col. 5, lines 10-13 and 17-20.	1-9 and 13-19
A	US 1,570,177 A (POINTER) 19 January 1926(19.01.1926).	1-20
A	US 1,165,452 A (RUDOLPH, F.E.) 28 December 1915(28.12.1915).	1-20

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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