

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
27 April 2006 (27.04.2006)

PCT

(10) International Publication Number
WO 2006/044256 A1

(51) International Patent Classification:
A47L 11/12 (2006.01) **B05C 17/12** (2006.01)

(21) International Application Number:
PCT/US2005/036188

(22) International Filing Date: 6 October 2005 (06.10.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/620,540 20 October 2004 (20.10.2004) US

(63) Related by continuation (CON) or continuation-in-part (CIP) to earlier application:
US 60/620,540 (CON)
Filed on 20 October 2004 (20.10.2004)

(71) Applicant (for all designated States except US): **BLACK & DECKER INC.** [US/US]; 1207 Drummond Plaza, Newark, DE 19711 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **CAMPBELL,**

David, C. [US/US]; 503 Barwick Court, Bel Air, MD 21014 (US). **BONE, Daniel** [GB/GB]; 5 Black Road, Langley Moor, County Durham DH7 8LW (GB).

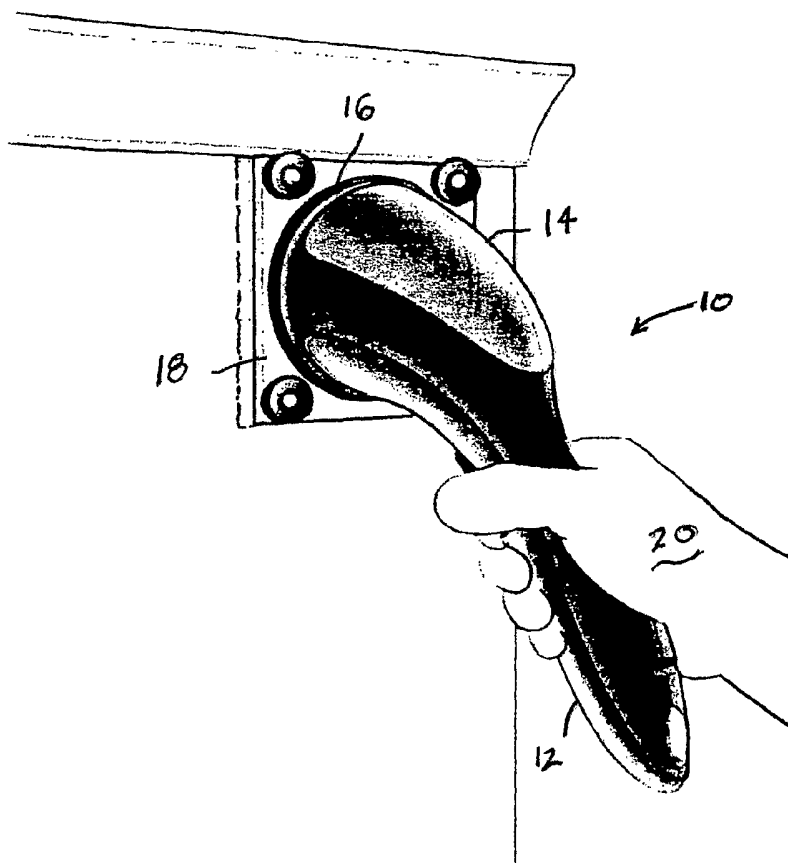
(74) Common Representative: **YUN, John** et al.; BLACK & DECKER INC., Group Patent Counsel, 701 E. Joppa Road - TW 199, Towson, MD 21286 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US (patent), UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

[Continued on next page]

(54) Title: POWERED PAINTING PAD



(57) Abstract: The present invention is directed to a power pool (10) having a paint pad (18) on an end thereof. The tool (10) may be corded, but is preferably cordless. The tool (10) can come in a variety of forms, but generally includes a housing for holding a battery and a motor, and includes a platen (16) orbitally driven by the motor. The paint pad (18) is replaceably attached to the platen (16).



European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

POWERED PAINTING PAD

Background of Invention:

[1]. Painting is a labor-intensive and time consuming task, often performed by non-professionals in their home or business. A variety of products exist to accomplish various painting tasks and help alleviate some of the work involved in painting. For example, paint can be applied using brushes, rollers, bristled pads, powered sprayers, etc. Some of these methods are not suited for controlled accurate paint application, and the methods that are suitable for more precision application often do not provide smooth or even coverage without the inconvenience of frequent reloading of paint. Therefore, it would be advantageous to provide a powered painting pad that evenly applies paint accurately with minimal effort and paint reloading by the user.

Summary of Invention:

[2]. The present invention is directed to a power tool having a paint pad on an end thereof. The tool may be corded, but is preferably cordless. The tool can come in a variety of forms, but generally includes a housing for holding a battery and a motor, and includes a platen orbitally driven by the motor. The paint pad is replaceably attached to the platen.

[3]. The orbital motion provided by the tool is similar to that in orbit sanders, polishers or other similar devices. However, the present powered painting pad is designed with less overall platen travel distance per unit of time than these known

devices to achieve superior painting results. Simply placing a painting pad on an orbit sander will not achieve the desired results because the vigorous orbital action will cause wandering or lurching of the pad relative to the work surface if the orbit speed is acceptable but the stroke distance is too large, or splattering of paint if the orbit stroke distance is acceptable but the orbit speed is too high. Additionally, large stroke distances can produce poor results when applying paint over a stencil pattern because the paint gets scrapped off as the pad moves outwardly away from the opening in the stencil.

[4]. Therefore, the present powered paint pad reduces the overall oscillatory distance traveled per unit of time of a typical orbit sander to apply a smooth and even coat of paint.

Brief Description of the Drawings:

- [5]. FIG. 1 shows an powered paint pad of the present invention;
- [6]. FIG. 2 shows the powered paint pad of FIG. 1 with an extension handle attached thereto; and
- [7]. FIG. 3 is a sectional view of a prior art platen.

Detailed Description of the Preferred Embodiments:

[8]. FIG. 1 shows a powered paint pad tool 10 of the present invention. The tool 10 has a rear handle portion 12 and a front head portion 14. The handle portion can be gripped by the user to apply the paint, or as shown in FIG. 2, an pole 22 can be attached to the handle portion 12 to extend the reach of the tool 10.

[9]. The head portion 14 includes a platen 16 to which replaceable painting pads 18 are attached. The painting pads 18 can be attached to the platen using any known method, such as Velcro™. Although the platen 16 is shown to be circular and the painting pad 18 square, it should be understood that both the platen 16 and painting pad 18 can be any shape.

[10]. The housing includes a motor, a drive mechanism, and a power source such as batteries, that drive the platen in an orbital motion. This type of tool is well known in the art for such applications as sanding and polishing, and typically have an oscillation radius R of 0.031 inches or greater and oscillation speeds ranging from 2,500 to 20,000 rpm. However, these sanding and polishing tools that operate in the lower speed range have oscillation radii well in excess of 0.047 inches in order to function properly for their intended application.

[11]. FIG. 4 shows a typical platen structure for an orbital tool. The oscillation radius R , which is directly related to the stroke distance, is defined as the distance

between the centerline of the motor or transmission shaft CLM and the centerline of the driven bearing on the platen CLP. Using these numbers, a platen travel distance (PTD) per unit time (t) can be measured, with $PTD/t = 2\pi R * rpm$. All known sanding and polishing tools have a PTD/t of 1472 inches/min. or greater.

[12]. The present powered paint pad has a reduced oscillation radius R of 0.005 inches to 0.032 inches and a reduced oscillation speed of 2500 to 8000 rpm, the absolute extreme combinations of which produce a PTD/t in the range of 78 to 1608 inches/min. However, the practical upper limit of this range is approximately 1300 inches/min due to the problems cited above (paint splattering, tool wandering and lurching). Satisfactory painting results were achieved with a oscillation radius of 0.015 inches and a rpm of 6500 resulting in a $PTD/t = 160$ inches/min. The reduced radius, in combination with the reduced speed, provide superior painting results without the disadvantages cited above.

[13]. Additionally, the motion of the platen is purely oscillatory, with no rotation. An anti-rotational feature is built into the mounting of the platen 16 to keep the platen 16 aligned with the main body of the tool 10. Rotation is removed so that non-circular paint pads can be used in corners, which would not be the case if rotational movement were permitted. The anti-rotation feature is common with orbit tools having square, rectangular or delta shaped (non-circular) platens, but is not found on orbital tools having circular platens. For example, orbit sanders and polishers with circular platens typically allow some rotational

movement to be superimposed on the oscillating motion to reduce the creation of tiny circular swirls on the surface being sanded or polished.

[14]. Therefore, the present invention is directed to an orbital tool whose stroke distance and oscillation speed are optimized for painting applications and provides a powered painting tool that allows a user to paint more quickly and accurately with less effort.

[15]. Although a preferred embodiment has been disclosed, it should be noted that the description of the invention is merely exemplary in nature and, thus, variations that do not depart from the gist of the invention are intended to be within the scope of the invention. Such variations are not to be regarded as a departure from the spirit and scope of the invention.

Claims

1. A powered paint tool comprising:
 - a housing having a motor therein;
 - a platen attached to the housing and driven in an orbital motion;
 - a paint pad secured to the platen; and
 - wherein the platen travel distance per unit time is less than 1300 inches per minute.

2. A method of using an orbital tool comprising:
 - providing an orbital tool having a platen with an oscillation radius of 0.005 to 0.032 inches and an oscillation speed of 2500 to 8000 rpm;
 - placing a paint pad onto the platen;
 - soaking the paint pad with paint; and
 - applying the paint to a surface.

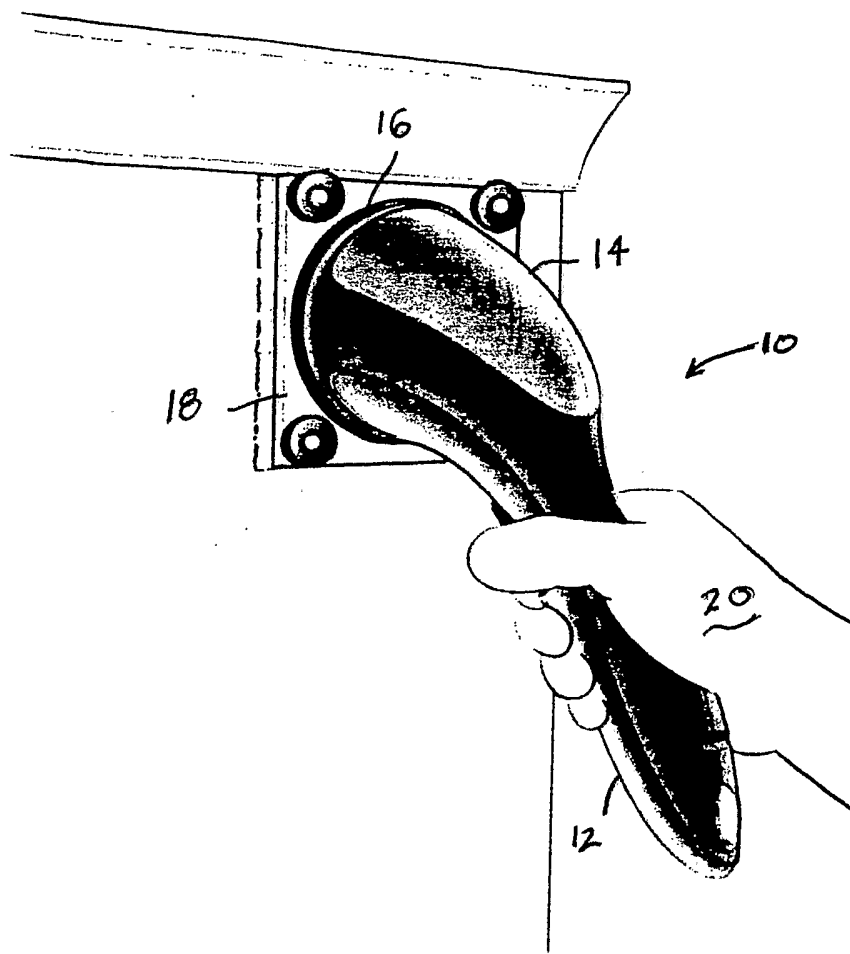


FIG. 1

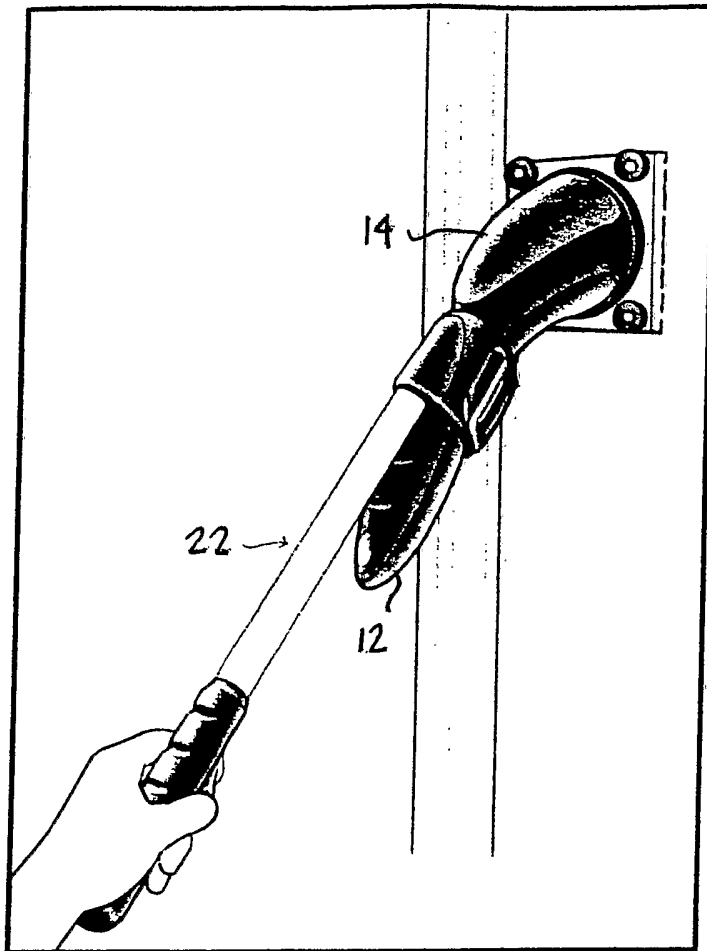


FIG. 2

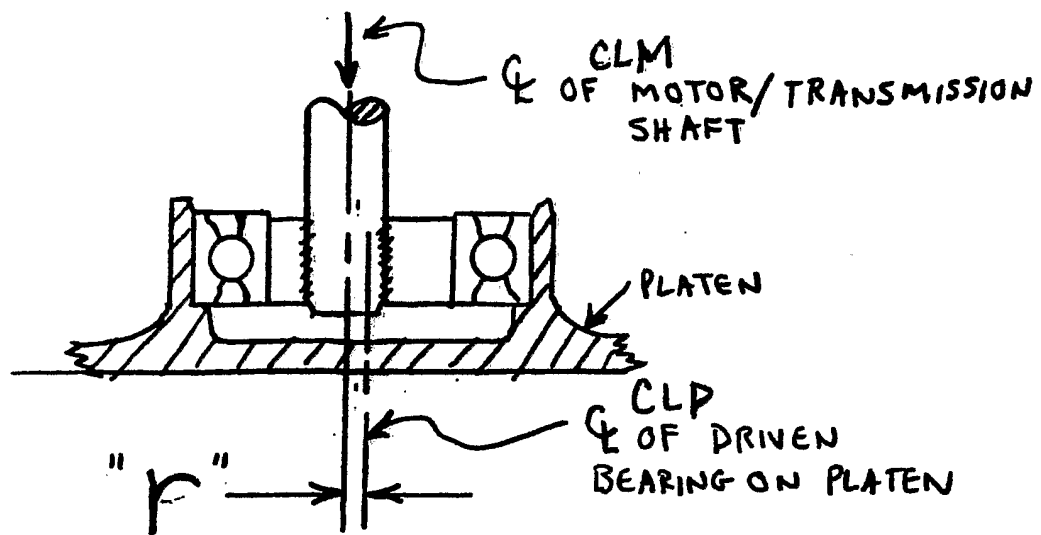


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/36188

A. CLASSIFICATION OF SUBJECT MATTER

IPC: A47L 11/12(2006.01)
A47L 11/00(2006.01)

USPC: 15/97.1,28;118/200

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. : 15/97.1,28;118/200

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)
EAST, DERWENT, EPO, JPO

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,731,894 A (ASHWORTH) 22 March 1988, see entire document.	1-2

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"B" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

23 February 2006 (23.02.2006)

Date of mailing of the international search report

20 MAR 2006

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner of Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Authorized officer

Randall Chin

Telephone No. (571) 272-1700

Facsimile No. (571) 273-3201

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/36188

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.