



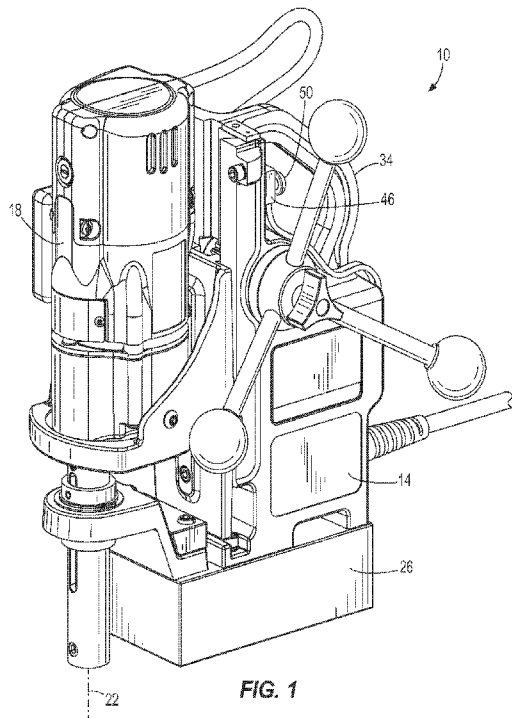
- (51) International Patent Classification:
B23B 45/14 (2006.01) B23B 39/04 (2006.01)
- (21) International Application Number:
PCT/US2014/034587
- (22) International Filing Date:
18 April 2014 (18.04.2014)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
61/813,813 19 April 2013 (19.04.2013) US
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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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(54) Title: ACCESSIBLE TEMPORARY MAGNET CONTROL FOR MAGNETIC DRILL PRESS



(57) Abstract: A drill press includes a main housing, a base coupled to the main housing and having an electromagnet, a drill unit supported by the main housing for relative movement therewith, a first switch selectively electrically connecting the electromagnet to a power source to energize the electromagnet, and a second switch for selectively interrupting power to the electromagnet.

WO 2014/172595 A1



Published:

— with international search report (Art. 21(3))

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

ACCESSIBLE TEMPORARY MAGNET CONTROL FOR MAGNETIC DRILL PRESS**CROSS-REFERENCE TO RELATED APPLICATIONS**

[0001] This application claims priority to co-pending U.S. Provisional Patent Application No. 61/813,813 filed on April 19, 2013, the entire content of which is incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to power tools, and more particularly to drill presses.

BACKGROUND OF THE INVENTION

[0003] Portable magnetic drill presses are typically used to drill holes in a workpiece to which the drill press is magnetically latched. Such drill presses can be heavy and difficult to hold by a user in an overhead or sideways orientation during attachment of the drill press to the workpiece being drilled.

SUMMARY OF THE INVENTION

[0004] The invention provides, in one aspect, a drill press including a main housing, a base coupled to the main housing and having an electromagnet, a drill unit supported by the main housing for relative movement therewith, a first switch selectively electrically connecting the electromagnet to a power source to energize the electromagnet, and a second switch for selectively interrupting power to the electromagnet.

[0005] The invention provides, in another aspect, a drill press including a main housing, a base coupled to the main housing and having an electromagnet, a drill unit supported by the main housing for relative movement therewith, a first switch actuatable between a closed state, in which power is delivered to the electromagnet from a power source to energize the electromagnet, and an open state, in which power to the electromagnet is interrupted, and a second switch wired in series with the first switch for selectively interrupting power to the electromagnet when the first switch is in the closed state.

[0006] The invention provides, in a further aspect, a drill press including a main housing, a handle coupled to the main housing, a base coupled to the main housing and having an electromagnet, a drill unit supported by the main housing for relative movement therewith, a toggle switch actuatable between a closed state, in which power is delivered to the electromagnet from a power source to energize the electromagnet, and an open state, in which power to the electromagnet is interrupted, and a normally closed momentary switch wired in series with the toggle switch for selectively interrupting power to the electromagnet when the toggle switch is in the closed state. The momentary switch is proximate the handle. The momentary switch is actuatable by a user of the drill press with a single hand, while gripping the handle, to interrupt power to the electromagnet when the toggle switch is in the closed state.

[0007] Other features and aspects of the invention will become apparent by consideration of the following detailed description and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a perspective view of a magnetic drill press in accordance with an embodiment of the invention.

[0009] FIG. 2 is an electrical schematic for the magnetic drill press of FIG. 1.

[0010] Before any embodiments of the invention are explained in detail, it is to be understood that the invention is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the following drawings. The invention is capable of other embodiments and of being practiced or of being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting.

DETAILED DESCRIPTION

[0011] FIG. 1 illustrates a magnetic drill press 10 including a main housing 14 and a drill unit 18 that is movable relative to the main housing 14, along a drilling axis 22, for drilling holes into a workpiece. The drill press 10 also includes a base 26 coupled to the main housing 14 (e.g., using fasteners) for supporting the main housing 14 and the drill unit 18 on the workpiece. In the

illustrated embodiment of the drill press 10, the base 26 includes one or more electromagnets 30 (FIG. 2) therein for magnetically latching the base 26 to a ferromagnetic workpiece.

[0012] With reference to FIG. 1, the drill press 10 includes a handle 34 coupled to the main housing 14. In the illustrated embodiment of the drill press 10, the handle 34 is integrally formed as a single piece with the main housing 14. Alternatively, the handle 34 may be a separate component from the main housing 14 and coupled thereto by any of a number of different structural elements and/or processes (e.g., using fasteners, by welding, etc.). The handle 34 is located near the top of the main housing 14 to facilitate carrying the drill press 10 and positioning the drill press 10 on a workpiece.

[0013] With reference to FIG. 2, the drill press 10 also includes a first, main power switch 38 located on the rear of the main housing 14 for selectively electrically connecting the electromagnets 30 to a power source 42 to energize the electromagnets 30. In the illustrated embodiment of the drill press 10, the main power switch 38 is a toggle switch wired in series (FIG. 2) between the power source 42 (e.g., AC line current, DC current provided by a remote or on-board battery, etc.) and the electromagnets 30 that is actuatable between an open state, in which power to the electromagnets 30 is interrupted, and a closed state, in which power is delivered to the electromagnets 30. Alternatively, the main power switch 38 may be configured differently provided that it's capable of switching between the open and closed states in response to user input.

[0014] With reference to FIGS. 1 and 2, the drill press 10 further includes a second, power interruption switch 46 wired in series with the main power switch 38 and between the power source 42 and the electromagnets 30 for selectively interrupting power to the electromagnets 30 when the main power switch 38 is in the closed state. In the illustrated embodiment of the drill press 10, the power interruption switch 46 is a normally closed momentary switch including a plunger 50 (FIG. 1) that is actuated or depressed by a user of the drill press 10, against the bias of an internal spring (not shown), for momentarily opening the switch 46 to interrupt power to the electromagnets 30 when the main power switch 38 is in its closed state. Releasing the plunger 50 allows the spring to return the plunger 50 to its extended position, thereby closing the switch 46 once again. Alternatively, the power interruption switch

46 may be configured as a normally closed momentary switch having a different configuration (e.g., a rocker or toggle). As a further alternative, the power interruption switch 46 may be configured as a conventional normally closed switch that must be manually actuated between open and closed states. As yet another alternative, rather than wiring the power interruption switch 46 in series with the main power switch 38, the power interruption switch 46 may be wired to a microcontroller or other software-based electrical component within the drill press 10 which, in turn, temporarily opens the circuit between the power source 42 and the electromagnets 30 to de-energize the electromagnets 30 in response to the power interruption switch 46 being actuated.

[0015] With continued reference to FIG. 1, the power interruption switch 46 is located proximate the handle 34 to permit the user of the drill press 10 to actuate the power interruption switch 46 with a single hand, while gripping the handle 34, to temporarily de-energize the electromagnets 30. In the illustrated embodiment of the drill press 10, the power interruption switch 46 is mounted to the main housing 14, with the plunger 50 oriented substantially transversely to the drilling axis 22. In this manner, a user of the drill press 10 can grasp the handle 34 with their fingers and actuate the power interruption switch 46 with their thumb. Alternatively, the power interruption switch 46 may be attached to the handle 34 and configured as a trigger that may be actuated with one of the user's fingers.

[0016] In operation of the drill press 10, the drill press 10 may be placed and supported upon a horizontal workpiece. Grasping the handle 34, the user can first coarsely align the drilling axis 22 with a desired hole location on the workpiece, and then finely adjust the position of the drill press 10 by nudging the base 26 and/or the handle 34. The main power switch 38 can then be actuated to electrically connect the power source 42 with the electromagnets 30, thereby energizing the electromagnets 30. Once energized, the electromagnets 30 magnetically latch the base 26 to the ferromagnetic workpiece to stabilize the drill press 10, permitting the user to drill the hole with the drill unit 18.

[0017] Should the user desire to use the drill press 10 in an overhead or sideways orientation, the user may first lift the drill press 10 for initial placement on an overhead or vertical ferromagnetic workpiece. Once placed, the main power switch 38 can be actuated to

electrically connect the power source 42 with the electromagnets 30, thereby energizing the electromagnets 30 to magnetically latch the drill press 10 to the workpiece. If the initial placement of the drill press 10 requires adjustment to a desired hole location in the workpiece, the user (while supporting the drill press 10) can then actuate the plunger 50, temporarily opening the power interruption switch 46 to de-energize the electromagnets 30 and unlatching the drill press 10 from the workpiece. This way, the user of the drill press 10 may expeditiously adjust the drill press 10 to the desired hole location while maintaining their grasp of the handle 34. After adjustment is completed, the plunger 50 is released, thereby closing the power interruption switch 46 and re-latching the drill press 10 to the workpiece. The user may then proceed to operate the drill unit 18 for drilling a hole in the workpiece.

[0018] Various features of the invention are set forth in the following claims.

CLAIMS

What is claimed is:

1. A drill press comprising:
 - a main housing;
 - a base coupled to the main housing and including an electromagnet;
 - a drill unit supported by the main housing for relative movement therewith;
 - a first switch selectively electrically connecting the electromagnet to a power source to energize the electromagnet; and
 - a second switch for selectively interrupting power to the electromagnet.
2. The drill press of claim 1, wherein the second switch is a normally closed momentary switch.
3. The drill press of claim 2, wherein actuating the second switch opens the second switch to interrupt power to the electromagnet.
4. The drill press of claim 1, wherein the first switch is a toggle switch actuatable between an open state, in which power to the electromagnet is interrupted, and a closed state, in which power is delivered to the electromagnet.
5. The drill press of claim 4, wherein the second switch is a normally closed momentary switch, and wherein actuating the second switch opens the second switch to interrupt power to the electromagnet regardless of the state of the first switch.
6. The drill press of claim 1, wherein the second switch is wired in series with the first switch.
7. The drill press of claim 1, further comprising a handle coupled to the main housing.

8. The drill press of claim 7, wherein the second switch is proximate the handle.
9. The drill press of claim 8, wherein the second switch is actuatable by a user of the drill press with a single hand, while gripping the handle, to interrupt power to the electromagnet.
10. A drill press comprising:
 - a main housing;
 - a base coupled to the main housing and including an electromagnet;
 - a drill unit supported by the main housing for relative movement therewith;
 - a first switch actuatable between a closed state, in which power is delivered to the electromagnet from a power source to energize the electromagnet, and an open state, in which power to the electromagnet is interrupted; and
 - a second switch wired in series with the first switch for selectively interrupting power to the electromagnet when the first switch is in the closed state.
11. The drill press of claim 10, wherein the second switch is a normally closed momentary switch.
12. The drill press of claim 11, wherein actuating the second switch opens the second switch to interrupt power to the electromagnet when the first switch is in the closed state.
13. The drill press of claim 10, further comprising a handle coupled to the main housing.
14. The drill press of claim 13, wherein the second switch is proximate the handle.
15. The drill press of claim 14, wherein the second switch is actuatable by a user of the drill press with a single hand, while gripping the handle, to interrupt power to the electromagnet.

16. A drill press comprising:
- a main housing;
 - a handle coupled to the main housing;
 - a base coupled to the main housing and including an electromagnet;
 - a drill unit supported by the main housing for relative movement therewith;
 - a toggle switch actuatable between a closed state, in which power is delivered to the electromagnet from a power source to energize the electromagnet, and an open state, in which power to the electromagnet is interrupted; and
- a normally closed momentary switch wired in series with the toggle switch for selectively interrupting power to the electromagnet when the toggle switch is in the closed state, wherein the momentary switch is proximate the handle, and wherein the momentary switch is actuatable by a user of the drill press with a single hand, while gripping the handle, to interrupt power to the electromagnet when the toggle switch is in the closed state.

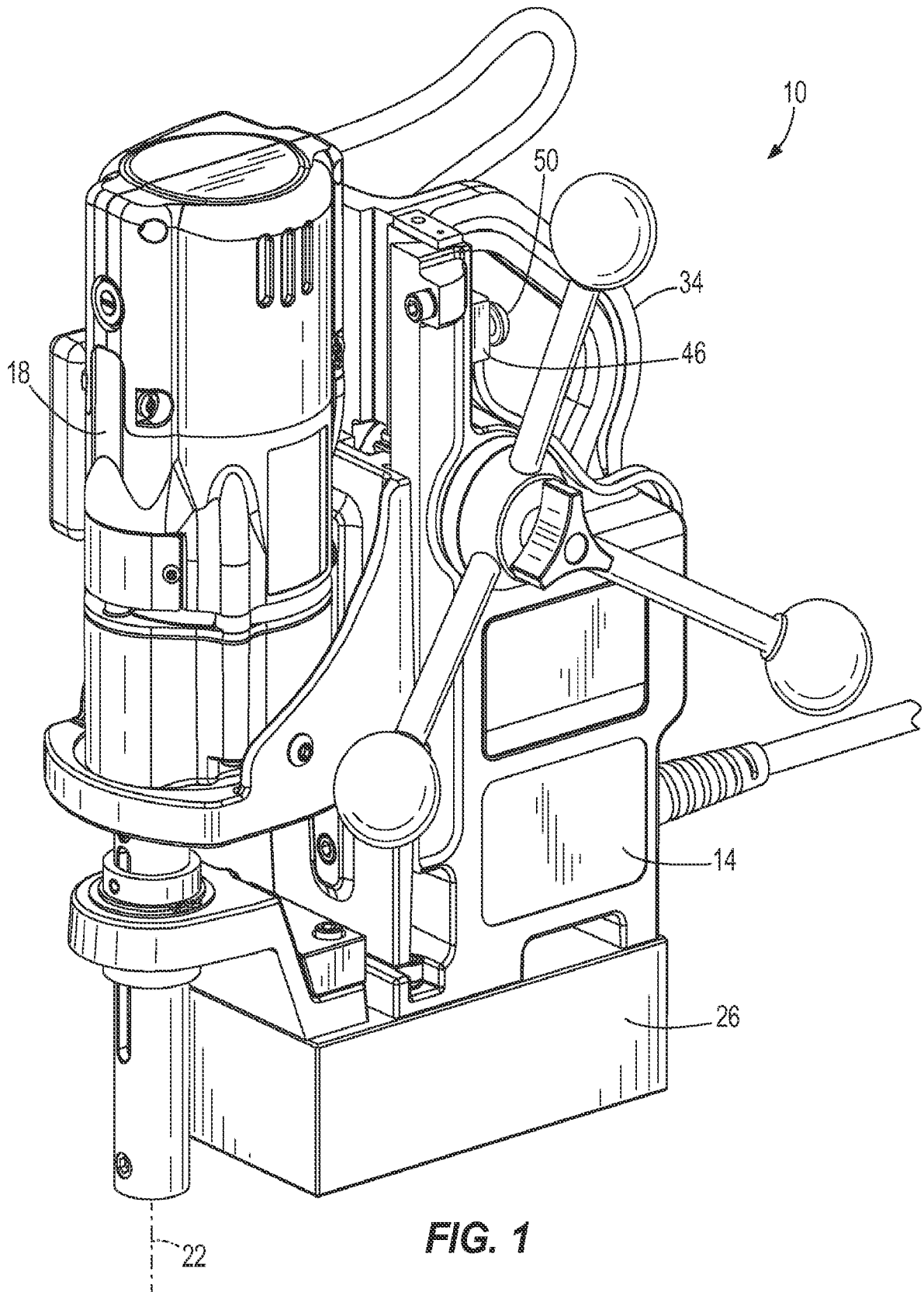


FIG. 1

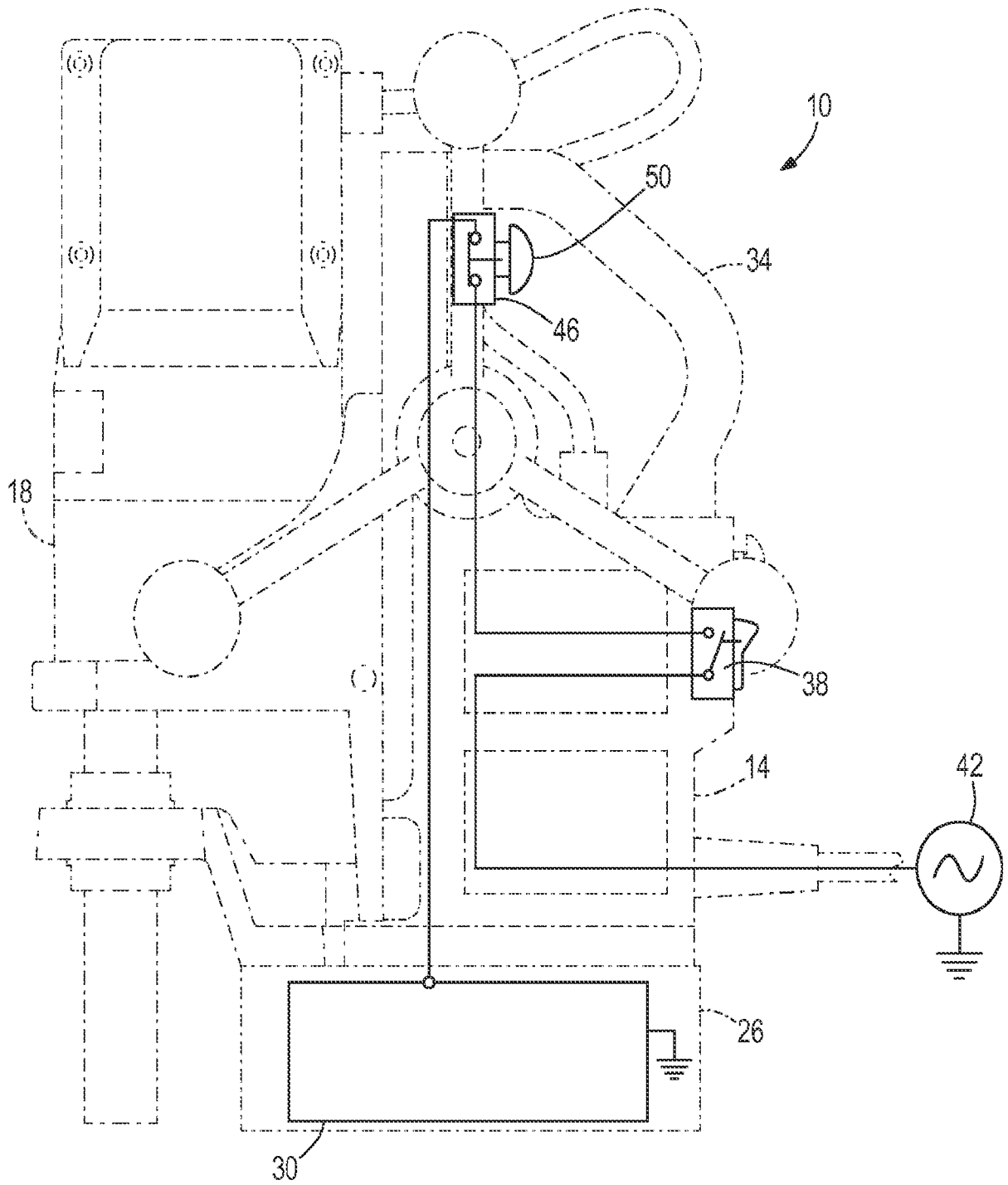


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/034587**A. CLASSIFICATION OF SUBJECT MATTER****B23B 45/14(2006.01)i, B23B 39/04(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHEDMinimum documentation searched (classification system followed by classification symbols)
B23B 45/14; B23B 49/00; B23B 47/28; B23B 47/00; B23B 39/04Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility modelsElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & keywords: drill, switch, interrupt, electromagnet, workpiece, and handle**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4591301 A (PELFREY, KEITH A.) 27 May 1986 See abstract, column 4, lines 19-42, column 7, lines 15-43, and figures 1,8.	1-8,10-14
A		9,15-16
A	US 2010-0021249 A1 (BEICHTER, MARTIN) 28 January 2010 See abstract, paragraphs [0044]-[0045], and figure 1.	1-16
A	KR 10-2013-0020403 A (STX OFFSHORE & SHIPBUILDING CO., LTD.) 27 February 2013 See abstract, paragraphs [0028]-[0031], and figure 3.	1-16
A	JP 03027538 B2 (NITTO KOHKI CO., LTD.) 04 April 2000 See paragraph [0013] and figure 2.	1-16
A	US 4530624 A (CUNEO, GIUSEPPE) 23 July 1985 See abstract, column 2, line 52 - column 3, line 26, and figure 1.	1-16

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search

26 August 2014 (26.08.2014)

Date of mailing of the international search report

29 August 2014 (29.08.2014)

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2014/034587

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4591301 A	27/05/1986	None	
US 2010-0021249 A1	28/01/2010	CN 101633057 A DE 102008035308 A1 EP 2147755 A2 EP 2147755 A3 EP 2147755 B1 US 8568066 B2	27/01/2010 28/01/2010 27/01/2010 05/01/2011 02/05/2012 29/10/2013
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JP 03027538 B2	04/04/2000	AU 1998-42997 A AU 713705 B2 DE 69729226 D1 EP 1016481 A1 EP 1016481 A4 EP 1016481 B1 JP 09-314409 A KR 10-0292850 B1 KR 10-2000-0010570 A MY 123109 A US 6072675 A WO 97-45222 A1	05/01/1998 09/12/1999 24/06/2004 05/07/2000 06/02/2002 19/05/2004 09/12/1997 17/09/2001 15/02/2000 31/05/2006 06/06/2000 04/12/1997
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