PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : H02G 3/22, 1/08, F16L 5/00 — A1

(11) International Publication Number: **WO 97/41626**

(43) International Publication Date: 6 November 1997 (06.11.97)

(21) International Application Number: PCT/AU97/00252

(22) International Filing Date: 28 April 1997 (28.04.97)

(30) Priority Data:

PN 9481	26 April 1996 (26.04.96)	AU
PN 9976	21 May 1996 (21.05.96)	AU
PO 1568	9 August 1996 (09.08.96)	AU

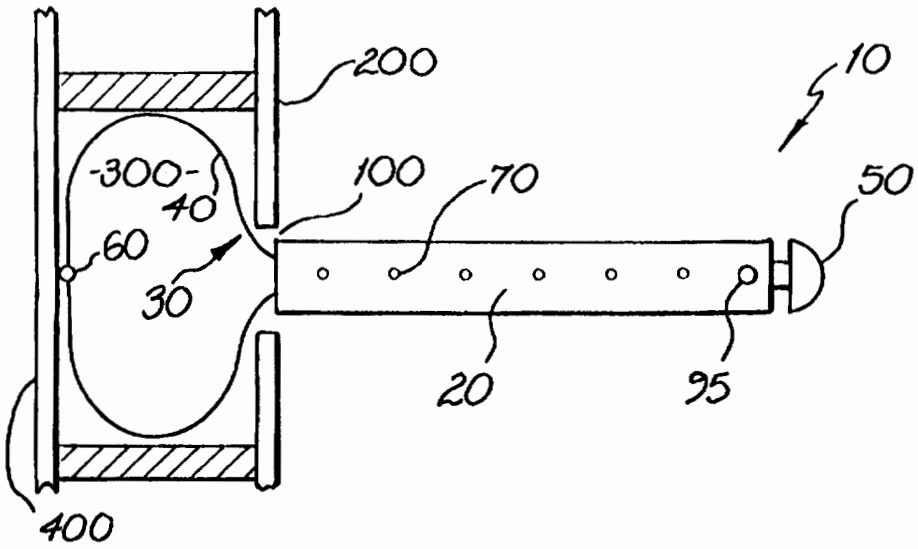
(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

(71)(72) Applicant and Inventor: BRUIN, Matthew, Charles [AU/AU]; 82 Suffolk Avenue, Collaroy, NSW 2097 (AU).

(74) Agent: GRIFFITH HACK; G.P.O. Box 4164, Sydney, NSW 2001 (AU).

Published
With international search report.

(54) Title: CABLE CATCHER



(57) Abstract

The invention relates to a device (10) and method for capturing a stringline or cable from within a wall cavity (300). The device (10) comprises a support (20) for supporting and feeding a flexible element (30) through a hole (100) within a wall portion (200) in a manner such that the element (30) will form a loop within the cavity (300) behind the wall portion (200). The device further includes means (50) for retracting the element (30) into the support (20). In use of the device (10), the flexible element (30) is fed into the wall cavity (300) to form the loop and the stringline or wiring is then dropped down the cavity (300) to pass through the loop. Thereafter the loop is closed by retracting the flexible element (30) into the support (20), and the stringline or electrical wiring is captured for whatever purpose as may be required.

Milwaukee Electric Tool Corporation
Ex-1005
Page 1 of 12

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	**ES**	Spain	**LS**	Lesotho	**SI**	Slovenia
AM	Armenia	**FI**	Finland	**LT**	Lithuania	**SK**	Slovakia
AT	Austria	**FR**	France	**LU**	Luxembourg	**SN**	Senegal
AU	Australia	**GA**	Gabon	**LV**	Latvia	**SZ**	Swaziland
AZ	Azerbaijan	**GB**	United Kingdom	**MC**	Monaco	**TD**	Chad
BA	Bosnia and Herzegovina	**GE**	Georgia	**MD**	Republic of Moldova	**TG**	Togo
BB	Barbados	**GH**	Ghana	**MG**	Madagascar	**TJ**	Tajikistan
BE	Belgium	**GN**	Guinea	**MK**	The former Yugoslav Republic of Macedonia	**TM**	Turkmenistan
BF	Burkina Faso	**GR**	Greece			**TR**	Turkey
BG	Bulgaria	**HU**	Hungary	**ML**	Mali	**TT**	Trinidad and Tobago
BJ	Benin	**IE**	Ireland	**MN**	Mongolia	**UA**	Ukraine
BR	Brazil	**IL**	Israel	**MR**	Mauritania	**UG**	Uganda
BY	Belarus	**IS**	Iceland	**MW**	Malawi	**US**	United States of America
CA	Canada	**IT**	Italy	**MX**	Mexico	**UZ**	Uzbekistan
CF	Central African Republic	**JP**	Japan	**NE**	Niger	**VN**	Viet Nam
CG	Congo	**KE**	Kenya	**NL**	Netherlands	**YU**	Yugoslavia
CH	Switzerland	**KG**	Kyrgyzstan	**NO**	Norway	**ZW**	Zimbabwe
CI	Côte d'Ivoire	**KP**	Democratic People's Republic of Korea	**NZ**	New Zealand		
CM	Cameroon			**PL**	Poland		
CN	China	**KR**	Republic of Korea	**PT**	Portugal		
CU	Cuba	**KZ**	Kazakstan	**RO**	Romania		
CZ	Czech Republic	**LC**	Saint Lucia	**RU**	Russian Federation		
DE	Germany	**LI**	Liechtenstein	**SD**	Sudan		
DK	Denmark	**LK**	Sri Lanka	**SE**	Sweden		
EE	Estonia	**LR**	Liberia	**SG**	Singapore		

CABLE CATCHER

Field of the Invention

The present invention relates to a device and method for retrieving stringlines or cables, particularly though not exclusively stringlines or cables from within cavity walls or floors.

Background of the Invention

When installing electrical cables in cavity walls or floors, conduits etc it is sometimes difficult to retrieve the wiring or cable from within the cavity. Normally a small hole or aperture is formed on one side of the cavity and a grabbing device, hook or similar is passed through the aperture to grab the stringline or cable and pull it through the aperture formed on said one side. This can be a time consuming and frustrating process because the cable or stringline is free to move within the cavity and can be difficult to grasp. Further, since the aperture formed in said one side is usually small, it is difficult to manipulate any device to grab the cable or stringline in the cavity.

In an effort to overcome some of the disadvantages of the prior art or at least provide a commercial alternative to the prior art, it would be advantageous if at least preferred forms of this invention provided a device for retrieving stringlines or cables from within a cavity wall or floor, quickly and easily, and that is simple to use and inexpensive to produce.

Summary of the Invention

In a first aspect the present invention provides a device for capturing a stringline or cable from within a cavity wall, the device comprising a support for supporting and feeding a flexible element through a hole in the wall such that the element forms a loop in the cavity so that the stringline or cable can be passed therethrough for capturing.

Preferably the device includes means for retracting the element towards the support.

Milwaukee Electric Tool Corporation
Ex-1005
Page 3 of 12

The element can be a cord means that is adapted for movement between an extended position in which it extends outwardly from a distal end of the support to form a loop sized to allow passage of the cable or stringline therethrough, and a retracted position in which at least a portion of the cord means is drawn towards the support to reduce the size of the loop and thereby grip the stringline or cable.

In use of the device, the flexible element is fed into the wall cavity to form the loop and the stringline or cable is then dropped down the cavity to pass through the loop. Thereafter, the loop is closed by retracting the flexible element into the support and the stringline or cable is captured for whatever purpose as may be required.

The cable typically can be electrical wiring that is fed into the cavity (eg. by an electrical contractor).

In another aspect, the present invention provides a method for capturing a stringline or cable from within a cavity wall, the method comprising the steps of

i) providing an aperture through one side of the cavity wall;

ii) feeding a flexible element through the aperture into a cavity in the cavity wall to form a loop;

iii) feeding the stringline or cable along the cavity and through the loop,

iv) withdrawing the element from the cavity to close the loop and thereby capture the stringline or cable; and

v) withdrawing the element with the captured stringline or cable through the aperture to retrieve the stringline or cable from the cavity.

In a preferred embodiment, the cord means is provided by a tape, wire or band. This tape, wire or band is preferably relatively inflexible in a plane perpendicular to the plane of the loop as compared to its flexibility in the plane of the loop (ie. it is

preferably sufficiently stiff to enable formation and maintenance of the loop).

In another embodiment, the element is preferably a pair of tapes passing through the support, these tapes being joined at their distal end by a hinge.

In yet another embodiment, the free ends of the element can be connected to a rod slidably received in the support for retraction or extension of the element relative to the support.

It is further preferred that the support is a tube and that the element is slidable therewithin.

Brief Description of the Drawings

Notwithstanding any other forms which may fall within the scope of the present invention, the present invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a diagrammatic representation of a device for retrieving string lines or cables from within a cavity wall, in a retracted position according to a first embodiment of the present invention;

Figure 2 is a diagrammatic representation of the device in Figure 1 in an extended position; and

Figure 3 is a diagrammatic representation of a device for retrieving string lines or cables from within a cavity wall according to a further embodiment of the present invention.

Modes for Carrying Out the Invention

Firstly, with reference to Figure 1, the device 10 comprises a support in the form of a tube 20 with a cord means (generally indicated by the numeral 30) slidably received therein. In this particularly preferred embodiment, the cord means 30 can comprise a pair of tapes 40. In the retracted position, these tapes are substantially parallel with their proximal ends either being connected to rod 50 (as shown in Figure 1) or passing along the tube 20 and out of the proximal end of the tube. The distal end of these tapes 40 are preferably connected by a hinge 60 to allow relative

movement therebetween as will be explained below.

Most preferably a dividing means 70 is provided in the tube in the form of a wall or a series of pins extending along the central axis of the tube. This dividing means 70 reduces twisting of the tape or cord in the tube 20. The cord means 30 can be extended or retracted in tube 20 in response to movement of rod 50.

Operation of the present inventive device will now be explained with reference to Figure 2.

To retrieve a cable or string line within the cavity 300 of a cavity wall, an aperture 100 is firstly formed through one side 200 of the cavity wall. The inventive device 10 is then positioned with a distal end of the tube 20 aligned with the aperture 100. The aperture 100 is sized so that at least the cord means 30 is adapted to pass through the aperture formed at side 200 of the cavity wall.

In their unextended state, tapes 40 are essentially linear and parallel to the axis of tube 20. The tapes 40 are also preferably no wider than tube 20. This allows for easy entry of the cord means into the cavity 300 of the cavity wall. The cord means 30 is moved to its extended position by forcing rod 50 into tube 20. As shown in Figure 2 this causes the cord means 30 to extend out into the cavity 300 until its distal end contacts the other side 400 of the cavity. Further, extension of the cord means 30 pushes open the hinge 60 as shown in Figure 2 such that the tapes 40 flex outwardly to form a loop 80 which ultimately covers a large proportion of the cavity 300. In this position, it is a simple matter of passing the cable or string line down the cavity 300 until it passes through loop 80. Once the cable or drawstring has passed through the loop 80, the rod 50 is extracted from tube 20 so that the cord means returns to its retracted position shown in Figure 1 to reduce the size of loop 80 and thereby grip the string line or cable. The cable or string line is then simply pulled through the aperture 100 in the cavity wall by withdrawal of the inventive

device 10.

By covering virtually the entire area of cavity 300 with loop 80, the string line or cable can be reliably captured.

In another preferred embodiment, the tube means 20 may comprise a fastening means 90 that is adapted to fasten the tube against the aperture 100. Further, the tube 20 or rod means 50 may comprise fastening means 95 to prevent relative movement therebetween. For example, rod 50 may comprise a series of apertures therethrough with a single aperture also being formed through tube 20 adjacent its proximal end. A pin may be provided to pass through the tube 20 to engage rod 50 and thereby prevent relative movement therebetween. This allows the rod to be maintained in a particular position relative to tube 20. In this way, an operator may move cord means 30 to its extended position shown in Figure 2 and then lock rod 50 in this position relative to tube 20. A similar effect may be obtained by a simple ratchet type mechanism that operates between rod 50 and tube 20.

This embodiment is particularly efficient as it allows a single operator to provide the desired string line or cable catching loop in the cavity wall, to leave the inventive device in this position and then to feed the cable or string line along the cavity through the loop 80 formed in the cavity. Once the operator has done so, he may then return to the inventive device and release the fastening means to thereby allow rod 50 to return to its retracted position, thereby closing loop 80 on the cable or string line for withdrawal through the aperture 100 formed in the cavity wall.

The inventive device may be formed of any particular material such as plastic. The cord means is most preferably formed of a material which is relatively inflexible in a plane perpendicular to the plane of the loop as compared to the flexibility in the plane of the loop. To explain, the cord means is most preferably flexible in at least one plane to thereby allow the cord

means 30 to form the desired loop 80 in the cavity wall. If the cord means is flexible in a plane perpendicular to the plane of the loop, it will simply fall down or droop inside the cavity wall making it more difficult to feed a string line or cable therethrough. By providing for example a metal tape or similar for cord means 30, the cord means remains substantially inflexible in a plane perpendicular to the plane of the loop. The plane of the loop may of course be altered by rotation of the device, if desired.

While the present invention has been discussed with reference to cavity walls, it will be understood that it is equally suitable for retrieving cables or string lines from other cavities such as cavity flooring in conduits etc. In a particularly preferred embodiment, the cord means is manufactured or at least marked with a fluorescent material. As will be understood by persons skilled in the art, this will allow an operator to easily locate the loop 80 formed in the dark cavity of the cavity wall.

It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.

CLAIMS:

1. A device for capturing a stringline or cable from within a cavity wall, the device comprising a support for supporting and feeding a flexible element through a hole in the wall such that the element forms a loop in the cavity so that the stringline or cable can be passed therethrough for capturing.

2. A device as claimed in claim 1, that further includes means for retracting the element towards the support.

3. A device as claimed in claim 1 or claim 2 wherein the element is a cord means that is slidably received in the support, the cord means being adapted for movement between an extended position in which it extends outwardly from a distal end of the support to form a loop sized to allow passage of the cable or stringline therethrough and a retracted position in which at least a portion of the cord means is drawn towards the support to reduce the size of the loop and thereby grip the stringline or cable.

4. A device as claimed in any of of claims 1 to 3 wherein the element is a tape, wire or band.

5. A device as claimed in claim 4 wherein the tape, wire or band is sufficiently stiff to enable formation and maintenance of the loop.

6. A device as claimed in any one of the preceding claims wherein the element is a pair of tapes passing through the support, the tapes being joined at their distal end by a hinge.

7. A device as claimed in any one of the preceding claims wherein free ends of the element are connected to a rod slidably received in the support for retraction or extension of the element relative to the support.

8. A device as claimed in any one of the preceding claims wherein the support is a tube and the element is slidable therewithin.

9. A device as claimed in any one of the

preceding claims wherein a dividing means is provided in the support to separate one part of the element from the other part of the element in the support.

10. A device as claimed in any one of the preceding claims wherein that part of the support from which the element extends is adapted for fastening engagement with the cavity wall in use.

11. A method for capturing a stringline or cable from within a cavity wall, the method comprising the steps of:

i) providing an aperture through one side of the cavity wall;

ii) feeding a flexible element through the aperture into a cavity in the cavity wall to form a loop;

iii) feeding the stringline or cable along the cavity and through the loop;

iv) withdrawing the element from the cavity to close the loop and thereby capture the stringline or cable; and

v) withdrawing the element with the captured stringline or cable through the aperture to retrieve the stringline or cable from the cavity.

12. A method as claimed in claim 11 when employing a device as claimed in any one of claims 1-10.

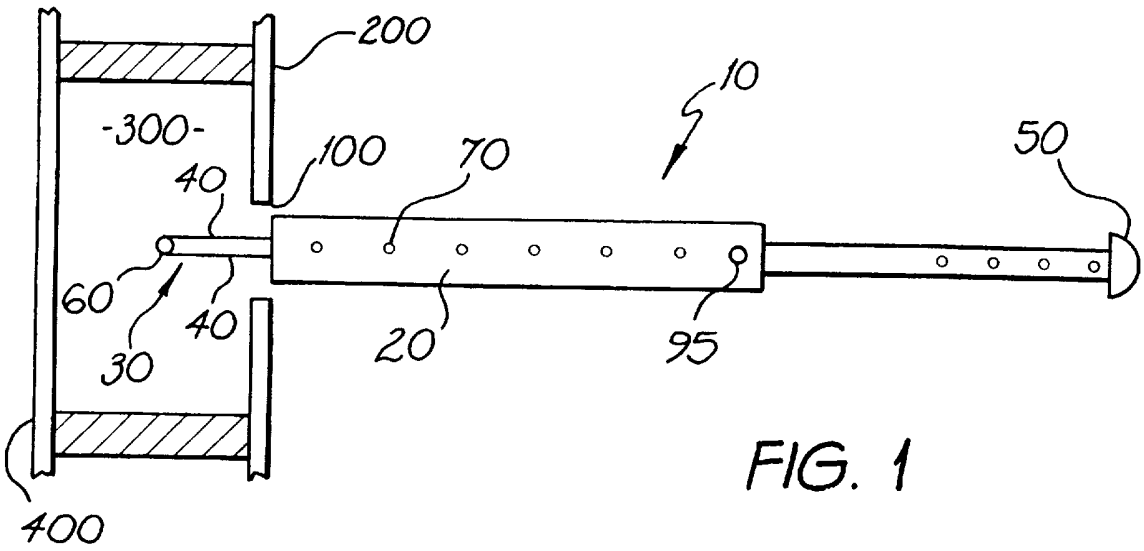


FIG. 1

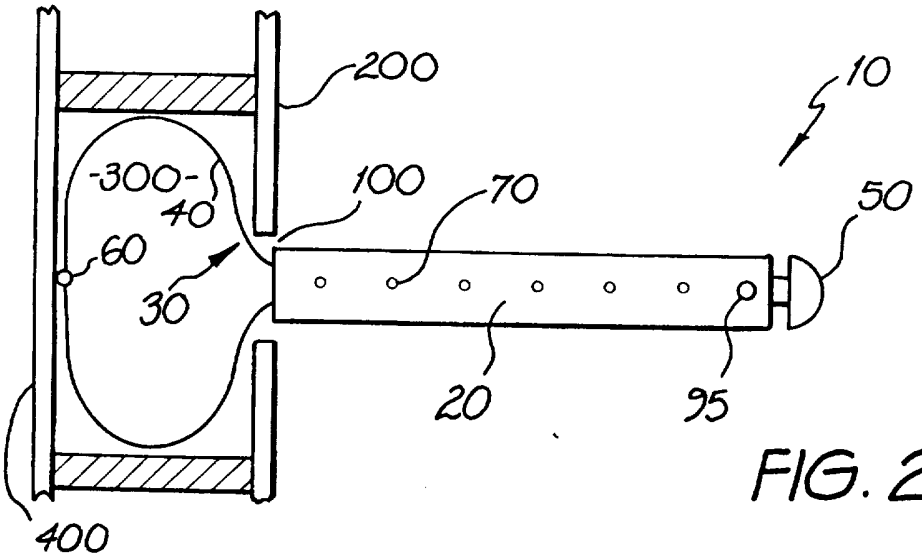


FIG. 2

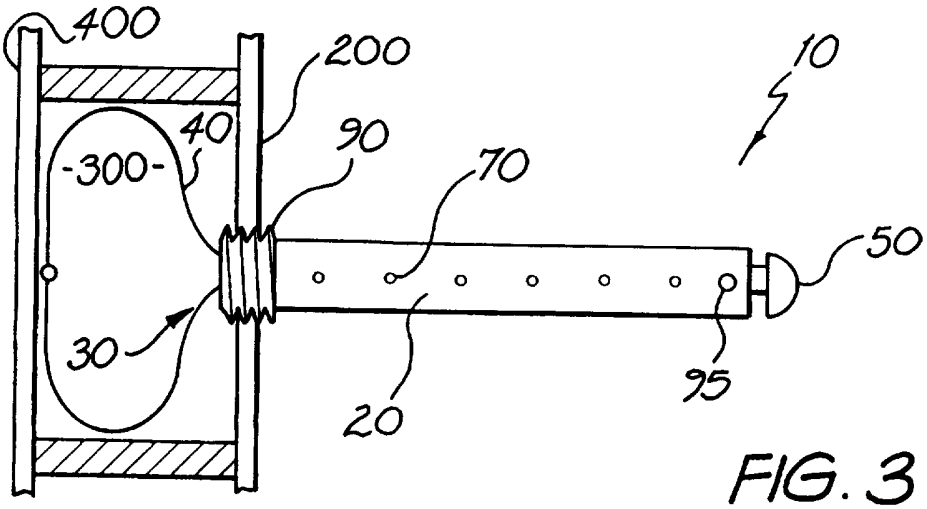


FIG. 3

Milwaukee Electric Tool Corporation
Ex-1005
Page 11 of 12

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 97/00252

A. CLASSIFICATION OF SUBJECT MATTER

Int Cl[6]: H02G 3/22, 1/08, F16L 5/00

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)
IPC: H02G 1/00, 1/08, 3/22, 3/26, 3/28, F16L 5/00, A01M 23/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WPAT

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2264200 A (MUGRIDGE) 18 August 1993 whole document	1-11
X	DE 3913936 A (WIEDECK J.) 31 October 1990 abstract, figs 1, 2	1-11
A	FR 2677188 A (DE PAOLA) 4 December 1992 abstract, figs 1, 2	1

☐ 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

"E" earlier document but published on or after the international filing date

"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)

"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	Date of mailing of the international search report
20 May 1997	23 MAY 1997
Name and mailing address of the ISA/AU AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (06) 285 3929	Authorized officer **A. ALI** Telephone No.: (06) 283 2607

Form PCT/ISA/210 (second sheet) (July 1992) copdeg