

1) Family number: 49821086 (US2013269180 AA)

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Title: MAINTENANCE TOOL FOR INSULATOR OF DIRECT CURRENT TRANSMISSION LINE

Priority: CN201020685182U 20101228 WO2011CN083179 20111129

Family:

Publication number	Publication date	Application number	Application date
■ CN202014054 U	20111019	CN201020685182U	20101228
■ US2013269180 AA	20131017	US20110976961	20111129
■ US9461447 BB	20161004	US20110976961	20111129
■ WO12088987 A1	20120705	WO2011CN083179	20111129

Probable Assignee: HEBEI ELECTRIC POWER MAINTENANCE CO

Assignee(s):(std): CHEN MING ; EHV TRANSMISSION AND SUBSTATION CO OF HEBEI ELECTRIC POWER CORP ; GAO ZHI ; GENG SANPING ; HEBEI ELECTRIC POWER MAINTENANCE CO ; JIAO JUXUAN ; KANG SHUFENG ; LI JIAN ; LI ZHONGSHENG ; SHI FENGXIANG ; SONG QIFENG ; STATE GRID CORP CHINA ; SU YONGJIE ; ULTRAHIGH PRESSURE TRANSMISSION BRANCH HEBEI ELECTRIC POWER CO LTD ; WANG JUN ; WANG XUEBIN ; YAO BOYAN ; ZHANG MINGXU

Assignee(s): EHV TRANSMISSION AND SUBSTATION COMPANY OF HEBEI ELECTRIC POWER CORPORATION ; STATE GRID OF CHINA CORP ; ULTRAHIGH PRESSURE TRANSMISSION BRANCH HEBEI ELECTRIC POWER CO

Inventor(s):(std): BOYAN YAO ; CHEN MING ; FENGXIANG SHI ; GAO ZHI ; GENG SANPING ; JIAN LI ; JIAO JUXUAN ; JUXUAN JIAO ; KANG SHUFENG ; LI JIAN ; LI ZHONGSHENG ; MING CHEN ; MINGXU ZHANG ; QIFENG SONG ; SANPING GENG ; SHI FENGXIANG ; SHUFENG KANG ; SONG QIFENG ; SU YONGJIE ; WANG JUN ; WANG XUEBIN ; XUEBIN WANG ; YAO BOYAN ; YONGJIE SU ; ZHANG MINGXU ; ZHI GAO ; ZHONGSHENG LI

Agent(s): FAEGRE BAKER DANIELS LLP; UNITALEN ATTORNEYS AT LAW

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): B23P19/00 H02G1/02 H02G1/04

CPC: H02G1/02 H02G1/04 Y10T29/53283

US class: 1/1 29/764

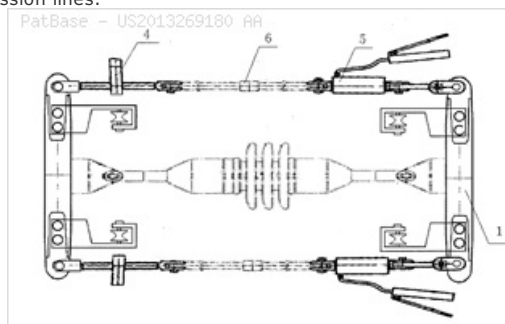
[Classification Explorer](#)

Cited documents: JP2004171946 A2, CN202014054 U, CN201509027 U, CN201126942 Y, CN102136695 A, CN2552142 Y, CN201332232 Y, CN201126944 Y, CN201126943 Y,

Forward Citations: CN105807101 A, CN106786137 A, CN106253144 B, CN106253144 A, CN103872621 B, CN103872621 A, CN110482318 A, CN110071460 A, CN109728542 A, US9461447 BB, CN103683106 A, CN103618244 B, CN103618244 A, WO15078279 A1, CN102163823 A, WO12088987 A1,

Abstract:

A maintenance tool for an insulator of a direct current transmission line comprises clamping devices and a tensioning device. The clamping devices are mounted at the two sides of the insulator through clamping, and the tensioning device is connected between the clamping devices. The clamping devices comprise a closed clamp (1), a single serial clamping device (2) and a wire end clamping device (30). The clamping device has advantages such as strong overall strength and bearing capacity, small size, light weight, and reliable working, and can be applied to replacement of various insulators on the direct current transmission line, reliably ensuring safe commissioning and regular maintenance of transmission lines.



2) Family number: 40924476 (US2009206305 AA)

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Title: REMOTE MANIPULATOR FOR MANIPULATING LIVE MULTIPLE SUB-CONDUCTORS IN A SINGLE PHASE BUNDLE

Priority: WO2006CA00909 20060602 EP20060752747 20060602 US20090227834 20090413
US20110374057 20111209 AU20120347497 20121210 WO2012US68729 20121210
EP20120856096 20121210 EP20170180094 20121210 US20130070555 20131103
US20150827976 20150817 AU20170202498 20170418 AU20190202859 20190424

Family:

Publication number	Publication date	Application number	Application date
■ AU2006344329 AA	20071213	AU20060344329	20060602
■ AU2006344329 BB	20110602	AU20060344329	20060602

AU2017202498 AA	20170504	AU20170202498	20170418
AU2017202498 BB	20190214	AU20170202498	20170418
AU2019202859 AA	20190516	AU20190202859	20190424
CA2653812 AA	20081128	CA20062653812	20060602
CA2653812 C	20150210	CA20062653812	20060602
DE602012036133 D1	20170928	DE201260036133T	20121210
DE602012069236 D1	20200430	DE201260069236T	20121210
DK2036179 T3	20180514	DK20060752747T	20060602
DK2789066 T3	20171127	DK20120856096T	20121210
DK3247012 T3	20200713	DK20170180094T	20121210
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EP2036179 A4	20150325	EP20060752747	20060602
EP2036179 B1	20180131	EP20060752747	20060602
EP3247012 A1	20171122	EP20170180094	20121210
EP3247012 B1	20200408	EP20170180094	20121210
ES2666193 T3	20180503	ES20060752747T	20060602
ES2647518 T3	20171222	ES20120856096T	20121210
ES2797116 T3	20201201	ES20170180094T	20121210
HK1245515 A1	20180824	HK20180104953	20180417
HR20171730 T1	20171229	HR20170001730	20171113
NO2892620 T3	20180929	NO13760005580	20130909
NZ573791 A	20120112	NZ20060573791	20060602
PL2036179 T3	20180831	PL20060752747T	20060602
PL2789066 T3	20180131	PL20120856096T	20121210
PT2036179 T	20180509	PT20060752747T	20060602
PT2789066 T	20171114	PT20120856096T	20121210
PT3247012 T	20200710	PT20170180094T	20121210
TR201716341 T4	20171121	TR20170016341T	20121210
TR201805207 T4	20180424	TR20180005207T	20060602
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US8573562 BB	20131105	US20060227834	20060602
US2014217245 AA	20140807	US20130070555	20131103
US9112338 BB	20150818	US20130070555	20131103
US10658822 BB	20200519	US20150827976	20150817
US2015357802 AA	20151210	US20150827976	20150817
WO07140569 A1	20071213	WO2006CA00909	20060602
ZA201404998 A	20170830	ZA20140004998	20140708
ZA201702446 A	20190731	ZA20170002446	20170407

Probable Assignee: QUANTA SERVICES OF CANADA LTD

Assignee(s):(std): DEVINE CLIFFORD ; DEVINE CLIFFORD WILLIAM ; O CONNELL DANIEL ; O CONNELL DANIEL N ; O CONNELL DANIEL NEIL ; QUANTA ASS L P ; QUANTA ASSOCIATES L P

Assignee(s): BANK OF AMERICA NA ADMINISTRATIVE AGENT AS ; CLIFFORD DEVINE ; DANIEL O CONNELL ; DEVINE CLIFFORD WILLIAMCOMPARTMENT 6, SITE 77AR.R. 1OLIVERB1V0H 1T0CA ; O CONNELL DANIEL NCOMPARTMENT 7, SITE 4R.R.#2OLIVERB1V0H 1T0CA ; O'CONNELL DANIEL NEIL ; QSI INC ; QSI INC2100-1360 POST OAK BLVDHOUSTONTX77056US ; QUANTA ASSET MANAGEMENT LLC ; QUANTA ASSET MANAGEMENT LLC2100-1360 POST OAK BLVDHOUSTONTX77056US ; QUANTA ASSOCIATES LP HOUSTON ; QUANTA ASSOCIATES LP2100 - 1360 POST OAK BOULEVARDHOUSTONTX77056US ; QUANTA SERVICE OF CANADA LTD ; QUANTA SERVICES INC ; QUANTA SERVICES INC2100 - 1360 POST OAK BLVD.HOUSTONTX77056US ; QUANTA SERVICES OF CANADA LTD ; QUANTA SERVICES OF CANADA LTD2100 - 1360 POST OAK BOULEVARDHOUSTONTX77056US

Inventor(s):(std): CLIFFORD W DEVINE ; CLIFFORD WILLIAM DEVINE ; DANIEL N O CONNELL ; DANIEL NEIL O CONNELL ; DEVINE CLIFFORD ; DEVINE CLIFFORD W ; DEVINE CLIFFORD WILLIAM ; O CONNELL DANIEL N ; O CONNELL DANIEL ; O CONNELL DANIEL N ; O CONNELL DANIEL NEIL

Inventor(s): DEVINE CLIFFORD W OSOYOOS ; DEVINE CLIFFORD WILLIAMCOMPARTMENT 6, SITE 77AR.R. 1OLIVERB1V0H 1T0CA ; O CONNELL DANIEL N OLIVER ; O CONNELL DANIEL NCOMPARTMENT 7, SITE 4R.R.#2OLIVERB1V0H 1T0CA ; O'CONNELL DANIEL NEIL

Agent(s): A J PARK ; AJ PARK ; ANTHONY C EDWARDS ; ANTONY C ; CHLOE LEE AND CO ; EDWARDS ANTONY C ; ELZABURU SLP ELZABURU SLP ; FELIPE FERNANDEZ POU ; HALISE BETUEL ATABAY VARLIK ; MOIR ELIZABETH ET AL ; OATHOUT LAW FIRM ; OATHOUT MARK A ; POWELL STEPHEN DAVID ; RPK PATENTANWALTE REINHARDT POHLMANN U KAUFMANN PARTNERSCHAFT MBB ; WILLIAMS POWELL

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

International class (IPC 8-9): B25J5/00 B63B35/03 B65H59/00 B66C1/42 B66C23/66 B66C23/68 B66C23/70 B66F3/00 E21C29/16 F16L3/00 F16M13/00 G08C G08C19/16 H02G H02G1/02 H02G1/04 H02G1/08 H02G7/00 H02G7/12

CPC: B66C1/42 B66C23/66 B66C23/68 H02G1/02 H02G1/04 G08C19/16

US class: 1/1 174/40R 248/49 248/544 248/68.1 254/134 254/134.3PA 254/134.3R 294/81.6

[Classification Explorer](#)

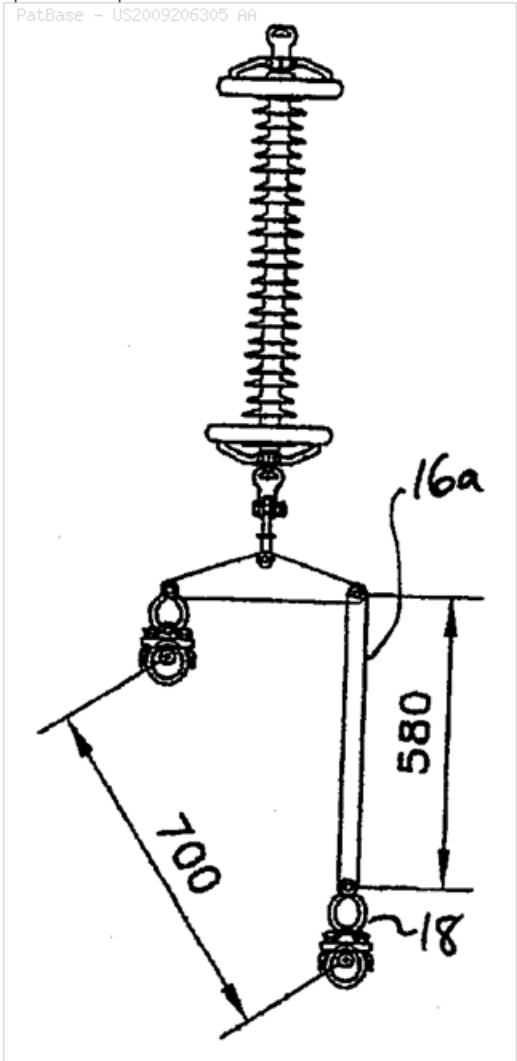
Cited documents: US2005133244 AA, US2010133490, US2009095522, US2008246010, US8585020, US8184015, US7546680, US7535132, US5538207, US5107954, US4973795, US8585020 BB, WO07140569 A1, CA2419417 AA, US2009095522 AA, US2008246010 AA, US8684333 BB, US8631720 BB, US8550211 BB, US8226069 BB, US8184015 BB, US7546680 BB, US7535132 BB, US7182173 BB, US6554144 BB, US6325749 BA, US4466506 A, US3889818 A, US3472395 A, US2662730 A, US2001034 A, US1793733 A, US1501590 A, US1050004 A, US6837671 BB, US4502505 A, US2010133490 AA, US6837671, US4973795 A, US5107954 A, WO9613885 A1, FR2603750 A1, US5183168 A, EP0940366 A1, FR2603750, US5183168, EP0940366, US2010122490 AA, US5538207 A,

Forward Citations: US10658822 BB, EP3573200 A1, EP3140889 B1, US2015357802 AA, EP3140889 A4, US2019222004 AA, US10644485 BB, US10622791 BB, US10295115 BB, US9938117 BB, US2016076696 AA, US2015249325 AA, WO11112874 A1, US2010133490 AA, US2008246010 AA, US8684333 BB, US8585020 BB, US8505878 BB, US8226069 BB, CN111181065 A, CN104836161 A,

Abstract:

A manipulator for separating sub-conductors in an energized single phase bundle includes a rigid support member and first and

second actuators mounted on the support member, wherein each actuator is independently actuatable of the other. Insulators are mounted on each actuator. A selectively releasable coupler is mounted on each insulator for selectively releasable coupling of each insulator to a corresponding sub-conductor. The actuators extend corresponding insulators independently of one another from the support member to thereby separate from each other by an optimized separation distance the distal ends of each insulator. When the corresponding sub-conductors of the single phase bundle are releasably coupled to the corresponding distal ends of the insulators the surge impedance loading of the single phase bundle may be improved by separation of the corresponding distal ends of the insulators and the sub-conductors by the optimized separation distance.



3) Family number: 42524850 (US2010133490 AA)

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Title:	BOOM MOUNTABLE ROBOTIC ARM			
Priority:	WO2006CA00909	20060602	WO2007CA00834	20070516
	EP20140176807	20070516	EP20140176808	20070516
	NZ20070601702	20070516	NZ20070620049	20070516
	US20090451492	20091116	US20110374057	20111209
	WO2012US68729	20121210	US20130083374	20131118
Family:			EP20070719758	20070516
			NZ20070581937	20070516
			US20090227834	20090413
			US20120555835	20120723
			US20140231280	20140331

Publication number	Publication date	Application number	Application date
AR089131 AA	20140730	AR2012P104625	20121210
AU2007353299 AA	20081120	AU20070353299	20070516
AU2007353299 BB	20150129	AU20070353299	20070516
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CL54149 B	20170508	CL20120002805	20121005
CN101803134 A	20100811	CN200780052998	20070516
CO6920054 A1	20140410	CO20120175776	20121005
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US2012175575 AA	20120712	US20110374057	20111209
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US9203219 BB	20151201	US20140231280	20140331
WO08138094 A2	20081120	WO2007CA00834	20070516
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WO13086488 A1	20130613	WO2012US68729	20121210

Probable Assignee:

QUANTA SERVICES OF CANADA LTD

Assignee(s):(std):

CLIFFORD DEVINE ; DANIEL O CONNELL ; DEVINE CLIFFORD WILLIAM ; O CONNELL DANEIL NEIL ; O CONNELL DANIEL ; O CONNELL DANIEL NEIL ; QSI INC ; QUANTA ASS L P ; QUANTA ASSET MAN LLC ; QUANTA ASSOCIATES L P ; QUANTA SERVICES ; QUANTA SERVICES INC ; QUANTA SERVICES OF CANADA LTD

Assignee(s):

BANK OF AMERICA NA ADMINISTRATIVE AGENT AS ; DEVINE CLIFFORD W ; DEVINE CLIFFORD W10607 - 81 STREETOSYOYOOSB1V0H 1V2CA ; O CONNELL DANIEL N ; O CONNELL DANIEL N7388 TUCELNUIT DRIVEOLIVERB1V0H 1T2CA ; QUANTA ASSET MANAGEMENT LLC ; QUANTA ASSOCIATES LP HOUSTON ; QUANTA ASSOCIATES LP2600 - 2800 POST OAK BOULEVARDHOUSTONTX77056-6175US ; QUANTA SERVICE OF CANADA LTD

Inventor(s):(std):

CLIFFORD WILLIAM DEVINE ; CONNELL DANIEL NEIL O ; DANIEL NEIL OCONNELL ; DEVINE CLIFF ; DEVINE CLIFFORD ; DEVINE CLIFFORD W ; DEVINE CLIFFORD WILLIAM ; DEVINE CLIFFROD WILLIAM ; NEIL O CONNELL DANIEL ; O CONNELL DANEIL NEIL ; O CONNELL DANIEL ; O CONNELL DANIEL N ; O CONNELL DANIEL NEIL ; WILLIAM DEVINE CLIFFORD

Inventor(s):

CLIFFROD WILLIAM DEVINE ; DEVINE CLIFFORD W10607 - 81 STREETOSYOYOOSB1V0H 1V2CA ; DEVINE CLIFFORD WILLIAM OLIVER ; O CONNELL DANIEL N7388 TUCELNUIT DRIVEOLIVERB1V0H 1T2CA ; O CONNELL DANIEL NEIL OLIVER

Agent(s):

A J PARK ; AJ PARK ; ANTHONY C ; ANTONY C ; ANTONY C EDWARDS ; DE ELZABURU ALBERTO ; EDWARDS ANTONY C ; LUZ CLEMENCIA DE PAEZ ; MOIR ELIZABETH ; PEDERSEN LUKE K ; POWELL STEPHEN DAVID ; RPK PATENTANWAELTE REINHARDT POHLMANN U KAUFMANN PARTNERSCHAFT MBB ; SILVA AND CIA PATENTES Y MARCAS LTDA ; WILLIAMS POWELL

Designated states:

AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9):

B25J13/00 B25J18/00 B25J18/04 B66C1/52 B66C23/00 B66C23/66 G08B19/42 G08C19/16 H02G1/00 H02G1/02 H02G1/04 H02G1/08

International class (IPC 1-7):

H02G1/02

CPC:

G08C19/16 H02G1/02 H02G1/04 Y10S269/903

US class:

1/1 174/70R 182/2.1 248/258 248/258.11 248/288.11 248/65 248/68.1 254/134.30R 254/134.3PA 254/134.3R 254/134.5 269/903 901/27 901/27S

[Classification Explorer](#)

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CA2134617 C, US8684333, US6978570, US6095468, US5967479, US5918845, US5909864, US5587637, US4917343, US4836486, US2010133490, US2009095522, US2189010, US2006182595, US2001034, US2001016087, US8226069, US6286812, US5934414, US5062227, US4194723, US3756442, US3356413, US2012319063, US2010123108, US2008008572, US7977571 BB, US7535132, US7216850, US6948701, US6837671, US6702130, US800636, US6325749, US6082552, US5944138, US5941507, US5791639, US5601270, US5538207, US5268591, US5193897, US5076449, US5054725, US5014863, US4852856, US4838381, US4466506, US60086, US2010237211, US2009206305, US2008224108, US4353399, US3631939, US3043394, US3005512, US2662730, EP1030321, US2008054235, US2005189527, US1580571, CA2537218, CA2419417, CA2537218 AA, CA2419417 AA, CA2134617 AA, CA2134617, US8684333 BB, US2189010 A, US2006182595 AA, US6978570 BA, US6095468 A, US5967479 A, US5918845 A, US5909864 A, US5587637 A, US4917343 A, US2009095522 AA, US4836486 A, US2001016087 AA, US2001034 A, US8226069 BB, US6286812 BA, US5934414 A, US5062227 A, US4194723 A, US2012319063 AA, US3756442 A, US3356413 A, US2010123108 AA, US2008008572 AA, EP1030321 A1, US800636 A, US7535132 BB, US7216850 BB, US5268591 A, US5076449 A, US60086 A, US5054725 A, US6948701 BB, US5944138 A, US5941507 A, US5791639 A, US6082552 A, US5014863 A, US6702130 BA, US5193897 A, US5601270 A, US2662730 A, US4353399 A, US3005512 A, US4852856 A, US3043394 A, US4838381 A, US3631939 A, US2010237211 AA, US2008224108 AA, US2009206305 AA, US2008054235 AA, US2005189527 AA, US1580571 A,

Forward Citations:

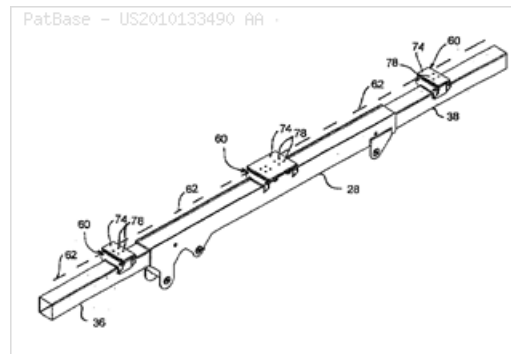
US4973795 A, US6837671 BB, US2003156936 AA, WO05022714 A2, US4502505 A, US2010133490 AA, US4466506 A, US6325749 BA, US5538207 A, CN105762702 B, CN105762702 A, WO19006449 A1, EP3148023 A1, CN102661301 A, CN102661301 B, RU2722177 C1, US2019221393 AA, WO17173343 A2, US2017287665 AA, US2014008511 AA, US10658822 BB, CN109074994 B, CN109074994 A, US10295115 BB, US10128067 BA, US2016076696 AA, US2015357802 AA, US9203219 BB, US9197041 BB, US2013134369 AA, US2014209843 AA, US8763973 BB, US2014097302 AA, US8684333 BB, US8585020 BB, US2012175575 AA, US2012286108 AA, US10024841 BB, US2016061809 AA, US10242830 BB, US2016159621 AA, EP3437116 A4, EP3573200 A1, CN106663926 B, AU2015255874 BB, EP3140889 B1, US10177545 BB, EP3140889 A4, WO17173343 A3, CN106663926 A, US2015249325 AA, WO15171929 A3, WO15013484 A3, EP3247012 B1, US10367337 BB, EP2789066 B1, EP3247012 A1, US9978175 BB, US9938117 BB, US2015030426 AA, AU2012347497 BB, WO16164836 A1, US2011011987 AA, US9112338 BB, US9038989 BB, US2014069717 AA, US8919735 BB, US2014217245 AA, US8714525 BB, US2012217458 AA, WO13086488 A1,

DE102017130190 A1

CN107394678 B, CN107394678 A, CN107533884 A, CN106671060 A, CN102064495 A,

Abstract:

A boom mountable robotic arm for temporarily supporting an elongate conductor includes a rigid member such as a beam or beam assembly adapted for mounting onto the upper end of a boom for example using a boom adaptor, at least one electrically insulated support post mounted to the rigid member, where each post temporarily supports an elongate electrical conductor, and at least two rotation devices for selectively controllable rotation of the rigid member and the electrically insulated support posts about at least two corresponding axes of rotation.

**4) Family number: 54906662** (US2013256613 AA)

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Title: MOBILE DEVICE CONFIGURED TO TRAVEL ON A TRANSMISSION LINE AND PROVIDE ASSISTANCE
Priority: US20120436520 20120330 US20120436462 20120330 US20120436299 20120330
US20120436404 20120330 WO2013US34037 20130327 WO2013US34030 20130327
WO2013US34014 20130327 WO2013US34022 20130327

Family:	Publication number	Publication date	Application number	Application date
	CN104204819 A	20141210	CN201380018552	20130327
	CN104272117 A	20150107	CN201380018628	20130327
	CN104520666 A	20150415	CN201380027324	20130327
	CN104520666 B	20171117	CN201380027324	20130327
	CN104321654 A	20150128	CN201380027333	20130327
	CN104321654 B	20180112	CN201380027333	20130327
	EP2839301 A1	20150225	EP20130767282	20130327
	EP2839301 A4	20160323	EP20130767282	20130327
	EP2839299 A1	20150225	EP20130768130	20130327
	EP2839299 A4	20161207	EP20130768130	20130327
	EP2834592 A1	20150211	EP20130768218	20130327
	EP2834592 A4	20161026	EP20130768218	20130327
	EP2831602 A1	20150204	EP20130769983	20130327
	EP2831602 A4	20160824	EP20130769983	20130327
	JP2015514386 T2	20150518	JP20150503492T	20130327
	JP2015515249 T2	20150521	JP20150503496T	20130327
	JP2015524238 T2	20150820	JP20150503501T	20130327
	JP2015515250 T2	20150521	JP20150503505T	20130327
	US2013261828 AA	20131003	US20120436299	20120330
	US9742165 BB	20170822	US20120436299	20120330
	US2013261797 AA	20131003	US20120436404	20120330
	US9246314 BB	20160126	US20120436404	20120330
	US2013257449 AA	20131003	US20120436462	20120330
	US9048639 BB	20150602	US20120436462	20120330
	US2013256613 AA	20131003	US20120436520	20120330
	WO13148776 A1	20131003	WO2013US34014	20130327
	WO13148782 A1	20131003	WO2013US34022	20130327
	WO13148788 A1	20131003	WO2013US34030	20130327
	WO13148794 A1	20131003	WO2013US34037	20130327

Probable Assignee: ELWHA LLC

Assignee(s):(std): ELWHA LLC ; ELWHA LLC A LTD LIABILITY CO OF STATE OF DELAWARE ; ELWHA LLC A LTD LIABILITY CO OF STATE OF DELAWARE ; HYDE RODERICK A ; WOOD JR LOWELL L

Assignee(s): ELWHA LLC A LIABILITY CO OF STATE OF DELAWARE LTD ; ELWHA LLC A LIABILITY CO OF STATE OF DELAWARE LTD

Inventor(s):(std): HYDE RODERICK A ; WOOD JR LOWELL L ; WOOD LOWELL L ; WOOD LOWELL L JR

Agent(s): CHAN ALISTAIR K ET AL; HARAKENZO WORLD PATENT AND TRADEMARK; HARRIS IAN RICHARD

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): B65H49/00 G01B5/28 G01R15/00 G01R19/25 G01R21/00 G01R27/28 G01R31/00 G01R31/02 G01R31/08 G01R31/11 G01R31/12 G05B15/00 G06F1/26 G06F19/00 G06K9/00 G06Q50/06 H02G1/02 H02G1/04 H02J13/00 H02J3/00

CPC: G06K9/00664 H02G1/04 G01R15/142 G01R15/26 G01R31/081 G01R31/11 G01R31/1245 G01R19/2513 H02G1/02 G01B11/14 B65H49/00 G01R31/50 Y10T29/532

US class: 1/1 242/590 254/134.3R 29/745 324/543 324/612 324/76.11 700/258 700/292 702/33 901/1 901/41 901/46

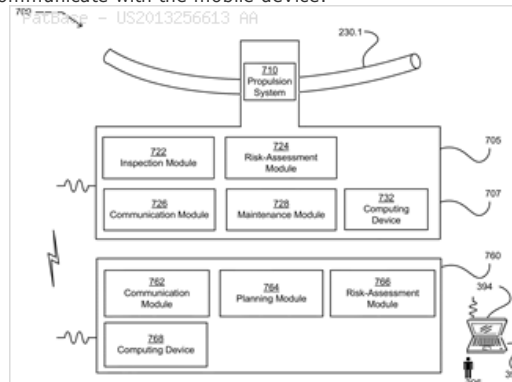
[Classification Explorer](#)

Cited documents: US2011195535 AA, US2011110108 AA, US2006201468 AA, WO11032127 A2, DE19729554 A1, US2011110396 AA, US2011011621 AA, US2010262393 AA, US2010230087 AA, US2010193175 AA, US2010087322 AA, US2010018672 AA, US2009322205 AA, US2009250449 AA, US2009019689 AA, US2008246507 AA, US2008246010 AA, US2005133244 AA, US2005017751 AA, US2002038199 AA, US7282944 BB, US6494141 BB, US6261481 BA, US5657620 A, US4626387 A, US3541487 A, US6408906 BA, US2012306510 AA, US2012019622 AA, US2009265193 AA, US2012271501 AA, US8275570 BB, US4818990 A, US4715582 A, US2011035052 AA, US7496459 BB, US2001015149 AA, US5524869 A, US4019715 A, US3289983 A, US3259370 A, US3174725 A, US3162992 A, JP2125511 U, JP62185506 A2, JP2008236969 A2, JP59148504 A2, JP2010239687 A2, JP10240705 A2, JP2000099484 A2, JP2003525008 T2, JP64087201 A2, JP4355612 A2, JP3289310 A2, JP11003490, JP63087201 A2, JP63077309 A2, WO04102757 A1, US6540207 BA, DE4240291 A1, DE3228239 A1, US2011101989 AA, US2011192315 AA, CN101299523 A, CN102317041 A, CN201877733 U, CN101800403 A, US2010100239 AA, CN201383635 Y, CN1404644 A, CN1055066, CN201903661, CN101495879, CN101023366, JP4859405 B2, CN102063112 A, CN101169460 A, JP4069944 B2, CN101017190 A, CN1658460 A, US2005033481 AA, CN201903661 U, CN101495879 A, CN101023366 A, CN1055066 A, WO12039767 A1, US2011196535 AA, WO11081274 A1, US2008288321 AA, EP0377939 B1, CN103154751 A, CN202121257 U, CN102317039 A, US2008249723 AA, CN101196551 A, CN102338824 A, WO10116255 A2, US2010231056 AA, US2009015239 AA, US2004189317 AA, US6293520 BA, CN102317040 A, US2007009215 AA, CN1361568 A, CN1221495 A, CN1216117 A, US4904996 A,

Forward Citations: CN110297496 A, US10461513 BB, WO19132674 A1, JP2018521432 T2, US10614307 BB, US2017277953 AA, US10242349 BA, US10600037 BB, CN105226556 A, US10705131 BB, US2017168107 AA, US10770870 BB, US10756542 BB, US10622798 BB, US10396533 BA, CN105957287 B, CN105957287 A, CN105356372 A, US9371960 BB, US2015204480 AA, CN109470945 A, CN109980574 A, CN104898700 B, CN104898700 A, US2019031443 AA, WO17133347 A1,

Abstract:

Described embodiments include a system and an apparatus. A described system includes a mobile device configured to travel on a transmission line between two transmission towers of a power transmission system, physically assist installation of a new conductor cable or line between the two transmission towers, and wirelessly communicate with an installation controller. The system includes the installation controller configured to control travel by the mobile device over the transmission line, to control provision of physical assistance by the mobile device, and to wirelessly communicate with the mobile device.



5) Family number: 67137907 (US2017287665 AA)

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Title: BOOM MOUNTABLE BREAKER AND METHODS OF USING SAME

Priority: US20160316232P 20160331 WO2017US25502 20170331 US20170475689 20170331
CL20180002773 20180928 US20190363731 20190325

Family:	Publication number	Publication date	Application number	Application date
	AR108042 AA	20180711	AR2017P100790	20170330
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	BR112018070151 A2	20190430	BR20181170151	20170331
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	EP3437116 A2	20190206	EP20170776829	20170331
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	HK1261685 A1	20200103	HK20190121570	20190328

IN201827036715 A	20190802	IN201827036715	20180928
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WO17173343 A3	20171102	WO2017US25502	20170331

Probable Assignee: QUANTA ASSOCIATES LP

Assignee(s):(std): QUANTA ASS L P ; QUANTA ASSOCIATES L P

Assignee(s): O CONNELL DANIEL NEIL ; WABNEGGER DAVID KARL

Inventor(s):(std): DANIEL NEIL O CONNELL ; DAVID KARL WABNEGGER ; O CONNELL DANIEL NEIL ; WABNEGGER DAVID KARL

Inventor(s): O U0027CONNELL DANIEL NEIL

Agent(s): AJ PARK; CHLOE LEE AND CO; EDWARDS ANTONY C; ESTUDIO CAREY LTDA; OATHOUT LAW FIRM; OATHOUT MARK A; WILLIAMS POWELL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KH KM KN KP KR KW KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): A61N5/00 B66C1/42 B66C23/66 H01H H01H71/02 H01H71/10 H02G H02G1/02 H02G1/04 H02G7/05

International class (IPC 1-7): H01H71/10 H02G1/02 H02G1/04 H02G7/05

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US class: 1/1 200/293

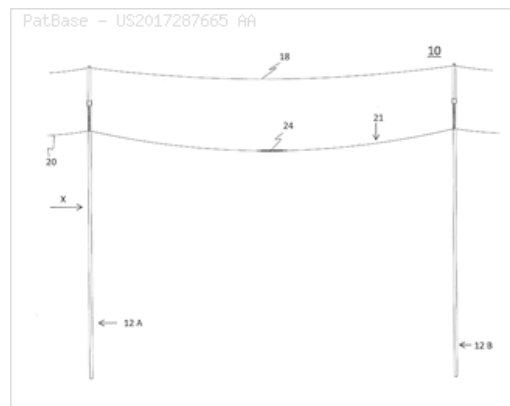
[Classification Explorer](#)

Cited documents: US10242830 BB, US4103121 A, US9038989 BB, US7535132 BB, US6770832 BB, US2005133244 AA, US2009095522 AA, US5538207 A, US2012175575 AA, US2014069717 AA, CN204332860 U, US8684333 BB, US8226069 BB, CN201126800 Y, CN1452204 A,

Forward Citations: CN110994464 A, US10254501 BB, US2019221393 AA, US10748728 BB,

Abstract:

A boom mountable breaker system and a method of using same for interrupting electrical transmission through a portion of an energized conductor downstream of a desired break location. The method includes: mounting the jumper onto the energized conductor across the desired break location so as to form an electrically conductive first parallel electrical path; installing an in-line opener in the energized conductor at the desired break location on the energized conductor; positioning the breaker at the desired break location on the energized conductor, and electrically connecting the breaker, while open, across the desired break location and across the opposite ends of the jumper so as to form a second parallel electrical path when the breaker is closed; closing the breaker to thereby complete the second parallel electrical path; removing the jumper from across the desired break location; and, opening and then removing the breaker.



6) Family number: 50505115 (US2013134369 AA)

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Title: METHOD AND APPARATUS FOR PROVIDING TEMPORARY SUPPORT AND A MEANS FOR RELOCATING ENERGIZED ELECTRICAL CONDUCTORS

Priority: US20100344432P 20100721 CA20102710631 20100721 WO2011CA00902 20110721
AU20110282439 20110721 CA20112805678 20110721 EP20110809120 20110721
US20110810634 20110721 US20130810634 20130116 US20150946474 20151119
AU20160208252 20160725 AU20180217287 20180816 US20190417251 20190520
AU20200205266 20200715

Family:	Publication number	Publication date	Application number	Application date
	AU2011282439 AA	20130314	AU20110282439	20110721
	AU2011282439 BB	20160728	AU20110282439	20110721
	AU2016208252 AA	20160811	AU20160208252	20160725
	AU2016208252 BB	20180517	AU20160208252	20160725
	AU2018217287 AA	20180906	AU20180217287	20180816
	AU2020205266 AA	20200806	AU20200205266	20200715
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	CA2710631 C	20151124	CA20102710631	20100721
	CA2805678 AA	20130116	CA20112805678	20110721
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	CA3079454 AA	20120126	CA20113079454	20110721

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DK2596559 T3	20170320	DK20110809120T	20110721
EP2596559 A1	20130529	EP20110809120	20110721
EP2596559 A4	20140108	EP20110809120	20110721
EP2596559 B1	20161214	EP20110809120	20110721
EP3148023 A1	20170329	EP20160197989	20110721
ES2618909 T3	20170622	ES20110809120T	20110721
HR20170397 T1	20170519	HR20170000397	20170309
NZ607350 A	20141031	NZ20110607350	20110721
PL2596559 T3	20170630	PL20110809120T	20110721
PT2596559 T	20170315	PT20110809120T	20110721
TR201702478 T4	20170321	TR20170002478T	20110721
US2013134369 AA	20130530	US20110810634	20110721
US9197041 BB	20151124	US20110810634	20110721
US10295115 BB	20190521	US20150946474	20151119
US2016076696 AA	20160317	US20150946474	20151119
US2019277444 AA	20190912	US20190417251	20190520
WO12009806 A1	20120126	WO2011CA00902	20110721
ZA201301334 A	20131127	ZA20130001334	20130220

Probable Assignee: QUANTA ASSOCIATES LP

Assignee(s):(std): QUANTA ASS L P ; QUANTA ASSOCIATES L P ; WABNEGGER DAVID

Assignee(s): BANK OF AMERICA NA ADMINISTRATIVE AGENT AS ; QUANTA ASSOCIATES LP HOUSTON

Inventor(s):(std): DAVID WABNEGGER ; O CONNELL DANIEL NEIL ; TRIP IAN EDWARD ; WABNEGGER DAVID ; WABNEGGER DAVID KARL

Inventor(s): WABNEGGER DAVID KEREMEOS

Agent(s): A J PARK; AJ PARK; ANTONY C; DE ELZABURU ALBERTO; EDWARDS ANTONY C; EXELL JONATHAN MARK; HALISE BETUEL ATABAY VARLIK; OATHOUT LAW FIRM; OATHOUT MARK A; RPK PATENTANWALTE REINHARDT POHLMANN U KAUFMANN PARTNERSCHAFT MBB; WILLIAMS POWELL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): F16M13/02 H02G H02G1/02 H02G1/04 H02G7/05

CPC: F16M13/022 H02G1/02 H02G1/04 H02G7/05

US class: 1/1 248/70 254/134.3PA

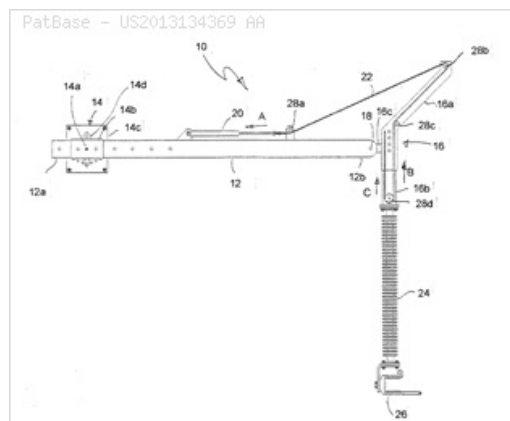
[Classification Explorer](#)

Cited documents: US2008264650 AA, US7216850 BB, US4190233 A, US3866759 A, US2009206305 AA, US2003156936 AA, US8226069 BB, US6101889 A, US5662451 A, US5520498 A, US5029717 A, US4846445 A, US4826474 A, US4775288 A, US4466506 A, US4432691 A, US4334668 A, US3945502 A, US3785462 A, US3753508 A, US3266775 A, US3261485 A, US3104399 A, US3064824 A, US2902257 A, US2501112 A, US7535132 BB, WO08138094 A2, US1235999 A, US7535132, US6434810, US6434810 BA, WO03005516 A1, FR1352827 A, US5538207 A, US7520398 BA, US6837671 BB,

Forward Citations: CN105162047 A, US10487974 BB, US9938117 BB, US2015030426 AA, CN106663926 B, US10348068 BB, CN106663926 A, US2015249325 AA, CN105529649 A, ITVR20130278 A1,

Abstract:

A temporary support and conductor re-locator includes a mounting arm and corresponding mounting bracket on one end of the arm, the other end supporting a pivotally mounted insulator depending downwardly from a crank arm. The upper end of the crank arm is attached to an actuator which, upon actuation, pivots the crank arm and insulator about the end of the support arm so as to rotate up and out of the way an energized conductor contained in the wire holder at the bottom end of the insulator. The support arm is temporarily mounted to an existing transmission line tower or pole so as to extend outwardly substantially horizontally therefrom thereby cantilevering outwardly of the tower the end of the arm supporting the crank arm and insulator. Actuation of the actuator firstly elevates a lower portion of the crank arm then rotates the crank arm about the cantilevered end of the support arm.



7) Family number: 31729407 (US2005133244 AA)

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Title:	LIVE CONDUCTOR STRINGING AND SPLICING METHOD AND APPARATUS			
Priority:	US20030498707P 20030829	EP20140189744 20040826	WO2004US27807 20040827	
	AU20040302823 20040827	EP20040786590 20040827	EP20060076674 20040827	
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	EP20060076675 20040827	US20040498707 20040827	EP20060076676 20040827	

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Family:

Publication number	Publication date	Application number	Application date
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WO05022714 A3	20050901	WO2004US27807	20040827

Probable Assignee: QUANTA ASSOCIATES LP

Assignee(s):(std): DEVINE CLIFFORD W ; DEVINE CLIFFORD WILLIAM ; O CONNELL DANIEL N ; O CONNELL DANIEL NEIL ; QUANTA ASSOCIATES L P ; QUANTA SERVICES ; QUANTA SERVICES HOUSTON

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Inventor(s): DEVINE CLIFFORD OLIVER ; DEVINE CLIFFORD W OLIVER ; O CONNELL DANIEL N OLIVER ; O CONNELL DANIEL NEIL OLIVER ; O'CONNELL DANIEL N

Agent(s): A J PARK; AJ PARK; ANTONY C; ANTONY C EDWARDS; BAKER AND HOSTETLER LLP SUITE 1100; BAKER AND HOSTETLER LLP, SUITE 1100; CHINA PATENT AGENT HK LTD; DE ELZABURU ALBERTO; EDWARDS ANTONY C; ELZABURU SLP ELZABURU SLP; EVIN KAZMIRCI; HALISE BETUEL ATABAY VARLIK; POWELL STEPHEN DAVID; RPK PATENTANWALTE REINHARDT POHLMANN U KAUFMANN PARTNERSCHAFT MBB; SEITZ HOLGER FRITZ KARL; TUGBA DERYA YILMAZ; WILLIAMS POWELL

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LI LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NA NE NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SN SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

International class (IPC 8-9): F16C F16C13/00 H01B7/00 H02G H02G1/02 H02G1/04 H02G5/00 H02G5/06 H02G7/00 H02H7/06

International class (IPC 1-7): H02G1/02 H02G7/00 H02H7/06

CPC: H02G1/02 H02G1/04

US class: 174/59 174/59S 174/68.2 174/68.200P 307/147 307/147P 322/29 322/29S 385/96 385/96S

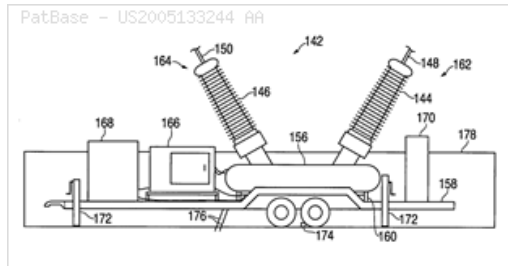
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Forward Citations: EP2149180 A4, CN102842867 A, EP2814126 A1, EP2814125 A1, EP2149180 A2, US2019181568 AA, US10811858 BB, EP3134947 B1, US10673220 BB, US10658822 BB, AU2015249876 BB, US10242830 BB, EP2596559 B1, EP3134947 A4, US2017287665 AA, US9882359 BB, EP3148023 A1, US2015357802 AA, US9478952 BB, US8573562 BB, US2009206305 AA, WO15164381 A1, US2010133490 AA, US2009295235 AA, WO15131022 A1, US9112338 BB, US8902559 BB, US2014217245 AA, US8766098 BB, US2012186853 AA, US8471416 BB, US10644485 BB, EP3335285 A4, US9960575 BB, JP2015019444 A2, WO17027825 A1, JP5486120 B1, US10781600 BB, US10770872 BB, US2019153742 AA, US10638140 BB, EP3437116 A4, US10367337 BB, EP3281208 A4, US2016365710 AA, WO17173343 A3, US9742165 BB, WO16164836 A1, US2015249325 AA, US9246314 BB, US2007158093 AA, US2009095522 AA, US2008246010 AA, US2008054235 AA, WO07140569 A1, US9048639 BB, US8755664 BB, WO13148794 A1, US2012288250 AA, US8505878 BB, US7977571 BB, WO09049283 A1, WO08124579 A1, WO08085164 A1, US7546680 BB, WO19023498 A1, CN109787142 A, CN103500964 A, CN110137854 A, CN108028517 A, CN103683097 B, CN103119292 A, CN103683097 A, CN103119292 B, CN101958519 A, CN107533884 A, CN110168826 A, WO08138094 A3, US8684333 BB, US8585020 BB, US8226069 BB, WO08138094 A2, CN106663928 B, CN106663928 A,

Abstract:

A method and apparatus for handling and/or stringing energized conductor for a high voltage power line conductor for a high voltage power line is provided. The method includes bringing components and workers to the same electrical potential and transferring power from one contractor to another. Associated apparatus is also described.



8) Family number: 64905780 (US2017047716 AA)

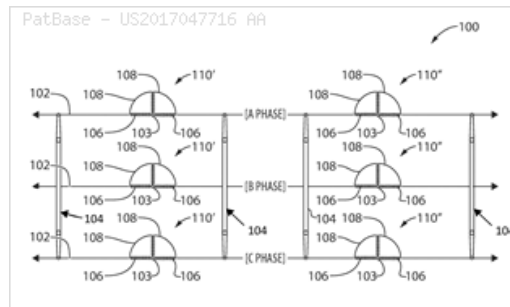
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Title: LIVE CONDUCTOR STRINGING, MAINTENANCE AND REPAIR METHOD
Priority: US20150204037P 20150812 WO2016US46844 20160812 US20160236002 20160812
US20200865141 20200501

Family:	Publication number	Publication date	Application number	Application date
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Probable Assignee: QUANTA ASSOCIATES LP
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Assignee(s): O CONNELL DANIEL NEIL ; PALMER ROBERT WAYNE ; QUAEDVIEG PHILLIP HOWARD ; WABNEGGER DAVID KARL
Inventor(s):(std): DANIEL NEIL O CONNELL ; DAVID KARL WABNEGGER ; KARL DAVID WABNEGGER ; O CONNELL DANIEL NEIL ; PALMER ROBERT WAYNE ; PHILLIP HOWARD QUAEDVIEG ; PHILLIP HOWARD QUAEDVIEG ; QUAEDVIEG PHILLIP HOWARD ; QUAEDVIEG PHILLIP HOWARD ; ROBERT WAYNE PALMER ; WABNEGGER DAVID KARL
Inventor(s): O U0027CONNELL DANIEL NEIL
Agent(s): AJ PARK; CHLOE LEE AND CO; EDWARDS ANTHONY C; EDWARDS ANTONY C; ESTUDIO CAREY LTDA; JOSE ANDRES RINCON USCATEGUI; OATHOUT LAW FIRM; OATHOUT MARK A; WILLIAMS POWELL
Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW
International class (IPC 8-9): H02G H02G1/02 H02G1/04 H02G7/00
International class (IPC 1-7): H02G1/02 H02G7/00
CPC: H02G1/04
US class: 1/1 29/857
Classification Explorer
Cited documents: US2017047716 AA, US2015249325 AA, US2009295235 AA, US10367337 BB, US9478952 BB, US8573562 BB, US8505878 BB, US7977571 BB, US7535132 BB, US6060972 A, US2009195083 AA, CN203445520 U, US2009095522 AA, CN1860653 A, US6191354 BA,
Forward Citations: CN110401137 A, US10644485 BB,

Abstract:
The present invention relates to replacing conductors in a high-voltage power transfer system. The method provides, for example, a method for maintaining sections of electrically conductive phases in a three-phase power conductor line, wherein the three phases are parallel and spaced apart in an ordered sequence. The phases are strung between support structures and supported above the ground. Maintenance work, which include replacement or repair, is performed on sections of the three phases without interrupting a power load in any one of the three phases and without transposing the relative positions of the phases out of their ordered sequence.



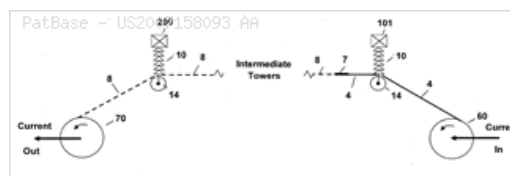
9) Family number: 34853270 (US2007158093 AA)

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Title:	SYSTEMS, METHODS AND APPARATUS FOR TRANSMISSION LINE RE-CONDUCTORING																							
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Probable Assignee:	BARTHOLD LIONEL O																							
Assignee(s):(std):	BARTHOLD LIONEL O																							
Inventor(s):(std):	BARTHOLD LIONEL O																							
Inventor(s):	BARTHOLD LIONEL																							
Agent(s):	BRIAN M; BRIAN M DINGMAN ESQ MIRICK OCONNELL DEMALLIE AND LOUGEE LLP; DINGMAN BRIAN M; DINGMAN BRIAN M ET AL; GOWLING LAFLEUR HENDERSON LLP; MIRICK OCONNELL DEMALLIE AND LOUGEE LLP																							
Designated states:	AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD MG MK ML MN MR MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW																							
International class (IPC 8-9):	H01R43/00 H02G1/04 H02G7/00 H02G7/14																							
CPC:	H02G1/04 H02G7/02 B60M1/28 Y10T29/49194 Y10T29/49195 Y10T29/532 Y10T29/53243																							
US class:	174/42 29/745 29/755 29/868 29/869																							
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Abstract:

A method and associated equipment for replacing existing overhead transmission line conductors with new ones while the transmission line remains in service and carrying power. The invention uses the old conductor to pull the new conductor through a series of sheaves installed at the bottom of each tower insulator. Conventional tension-stringing principles are used to assure that both the old and new conductors maintain a safe distance from ground. To achieve this, both the pulling and tensioning (braking) equipment, as well as supply and take-up reels or drums may be elevated to power line voltage and the current is transferred between new conductor and old, while in transit to the line, by means of a brush system and a conducting wheel which may or may not be integral with pulling and tensioning equipment.



Inventor(s):(std): BARTHOLD LIONEL O

Agent(s): BRIAN M; DINGMAN BRIAN M ET AL; DINGMAN IP LAW PC; MIRICK OCONNELL DEMALLIE AND LOUGEE LLP

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): B63B35/03 B65H59/00 E21C29/16 H01R43/00 H02G1/02 H02G1/04 H02G1/08 H02G7/20

CPC: H02G1/04 Y10T29/49194

US class: 254/134.30RP 254/134.3PA 254/134.3R 254/214 29/868

[Classification Explorer](#)

Cited documents: WO04079877 A1, US2008246010 AA, US2009206305 AA, US5538207 A, US4343443 A, US3030075 A, US7882630 BB, US2009195083 AA, US7546680 BB, US7535132 BB, US7353602 BB, US6837671 BB, US2003098450 AA, US2002100898 AA, US2005133244 AA, US4661662 A, US2007056463 AA, US2006033463 AA, US6325749 BA, US5661903 A, US5029816 A, US4814550 A, US4596379 A, US4531714 A, US3753284 A, US3708779 A, US3271009 A, US3137765 A, US3073574 A, US2929136 A, US2680394 A, US2188715 A, US1520628 A,

Forward Citations: CN107533884 A, KR101167612 B1, EP3134947 B1, US10644485 BB, US9882359 BB, WO17027825 A1, US2015249325 AA, WO15164381 A1,

IT201800009196 A1

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Abstract:
Equipment and associated methods for replacing existing overhead transmission line conductors with new ones while the transmission line remains in service and carrying power. The old conductor is used to pull the new conductor through a series of sheaves installed at the bottom of the insulator at each tower. Conventional tension-stringing equipment is used but it is elevated to line potential that is achieved by use of an insulating platform or insulating jacks. Current transfer between stationary and moving conductors is achieved by a current transfer device that may consist of transmission line contacting wheels and liquid metal contactors. Sag control in various conductor spans is enhanced by a stringing block with controllable friction. Equipment is also introduced which will prevent release of the conductor by the pulling device should it break while engaged by that device.

