

Search history

- Search 1: flange (Results 1000000)
- Search 2: gasket (Results 389913)
- Search 3: groove (Results 1000000)
- Search 4: ring (Results 1000000)
- Search 5: cap screw (Results 23425)
- Search 6: coupling (Results 1000000)
- Search 7: adapter (Results 622673)
- Search 8: pipe (Results 1000000)
- Search 9: 1 and 2 (Results 112692)
- Search 10: 3 and 4 (Results 846792)
- Search 11: (Results )
- Search 12: 7 and 8 (Results 70018)
- Search 13: 5 and 6 (Results 4356)
- Search 14: 9 and 10 (Results 29588)
- Search 15: 12 and 13 (Results 150)
- Search 16: 14 and 15 (Results 19)

1) Family number: 8382014 (US4293047A)

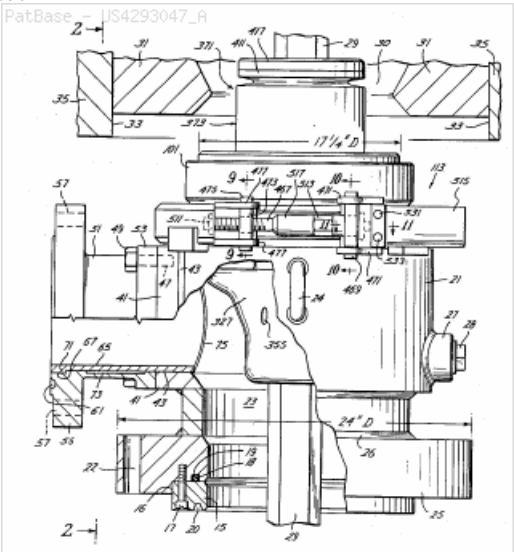
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Title: Drilling head

**Abstract:** A drilling head includes a tubular body with top, bottom and side openings. An oriented side outlet with an oriented replaceable bushing is releasably connected to the side opening. The head without the side outlet will pass through most rotary tables. A top closure closes the annulus between a portion of the head above the side opening and a drive tube such as a kelly extending through the head. The top closure includes a rotor, adapted to form a non-rotating seal with the kelly, and a stator, with a rotating seal between the stator and rotor. The stator is supported on and releasably connected to the body. The rotor includes a seal tube rotatably supported by inboard bearings on the stator located above the rotating seal. The top closure is small enough to pass through even rotary tables that are too small to pass the drilling head.

Classifications:

**International (IPC 8-9):** E21B3/04 E21B33/08 (Advanced/Invention);  
E21B3/00 E21B33/02 (Core/Invention)  
**International (IPC 1-7):** E21B3/04  
**CPC:** E21B3/04 E21B33/085  
**European:** E21B3/04 E21B33/08B  
**US:** 175/195 277/343 285/363



Family:

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US4293047 A        | 19811006         | US19790069324      | 19790824         |

Priority:

US19790069324 19790824

**Probable Assignee:** SMITH INTERNATIONAL  
**Assignee(s):** (std): SMITH INT ; SMITH INTERNATIONAL  
**Assignee(s):** SMITH INTERNATIONAL INC

2) Family number: 20413046 (US1950390A)

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Title: LUBRICATION

**Abstract:** 1. A steering knuckle of the type having clevises encircling and bearing upon the protruding upper and lower ends of a king pin fixed in the axle and including an enclosed roller bearing in the upper clevis encircling said king pin and sustained upon a head resting on top of the axle; the combination therewith of a lubricant inlet cap fixed upon the upper end of the king pin and allying one or more passages into the enclosure for said roller bearing, said king pin having one or more lateral bores in the upper end thereof, leading inward from said enclosure and a longitudinal bore in communication therewith for feeding lubricant to the lower bearing thereof.

Classifications:

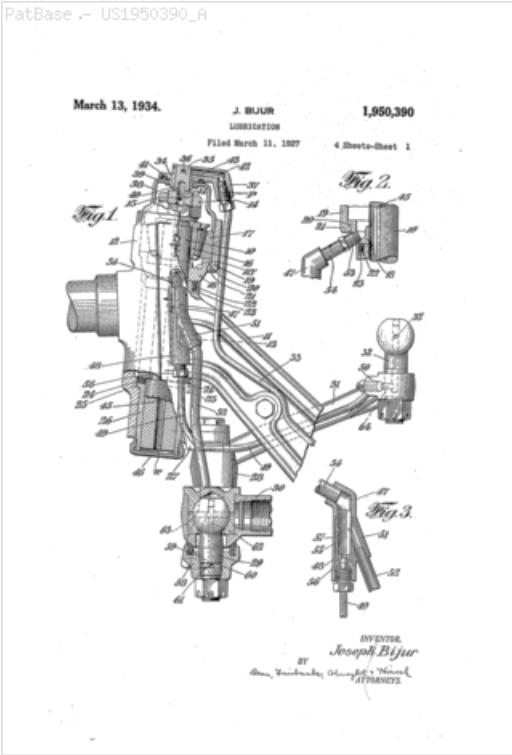
**International (IPC 8-9):** B60R17/02 (Advanced/Invention);  
B60R17/00 (Core/Invention)

**International (IPC 1-7):** F16N21/00

**CPC:** B60R17/02

**European:** B60R17/02

**US:** 184/7.3 384/396



Family:

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US1950390 A        | 19340313         | US19270174480      | 19270311         |

Priority:

19260329 US19270174480 19270311

**Probable Assignee:** AUTO RESEARCH CORP

**Assignee(s): (std):** AUTO RESEARCH CORP

**Inventor(s): (std):** JOSEPH BIJUR

**Inventor(s):** BIJUR JOSEPH

3) Family number: 205048 (GB1002559A)

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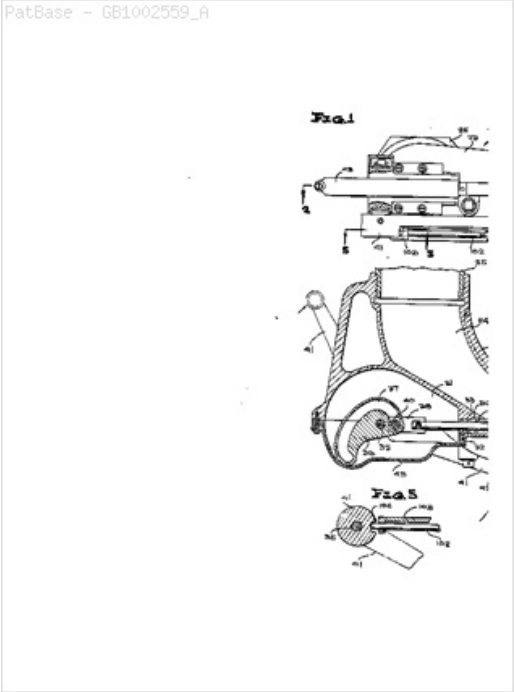
Title: Fuel nozzle and adapter assembly

**Abstract:** 1,002,559. Pipe couplings. PARKER HANNIFIN CORPORATION. Nov. 20, 1961 [Nov. 21, 1960], No. 41368/61. Heading F2G. A nozzle and adapter assembly comprises a nozzle body 23 having a tubular nose 70 slidably disposed thereon and forming an extension thereof and having sealing means 75 for engagement with a seat 51 on an adapter body 44, the nose being urged by resilient means 81 to a projected position on the nozzle body and the latter having a valve member 26 engaged with the nose and closing the nozzle body adjacent the adapter body. There are co-operating means on the nozzle body and adapter body for interlocking the bodies with the sealing means 75 spaced from the seat 51 and permitting relative rotation of the bodies, and means carried by the nozzle body and connected to the valve member for moving the member to an unseated position wherein the nose is released and the sealing means are engaged with the seat. As shown, the valve 26 is carried by a rod 28 passing into a cavity 31 formed in the body 23 and coupled by a fitting 38 carrying a roller 40 to a cam member 36 having a cam track 37 for the roller and secured to a shaft 35. The latter is rotatable by a crank 41 to move the valve to the open or closed position. The sleeve 70, telescoped over the forward end of the nozzle, is provided with an inner valve seat for engagement by the sealing ring 27 of the valve 26, and a sealing ring 75 intended for engagement with the valve seat 51 of the sleeve 47 of the adapter 22. Longitudinal bores 78 in the body 23 house spring-loaded balls 80 which bear against the flange 72 of the sleeve 70 to urge the latter outwardly. An extension 82 secured to the body 23 has a set of circumferentially spaced, radially movable balls 85 in sockets 86, and sockets 95, Fig. 8, housing balls 96 bearing against spring members 91 seated in recesses 90 in a sleeve 88 and engaging a shoulder 94; movement of the balls outwardly causes the members 91 to disengage from the shoulder to allow the sleeve to move forwardly. Manual retraction of the sleeve 88 is facilitated by grip members 97, and the sleeve is provided with a rearwardly-extending, slidable rod, adjustable in length, which, when the sleeve is in the retracted position thereof, engages in a

notch in the crank to prevent rotation of the latter whereby the valve 26 will be moved to an open position and when the nozzle is ont coupled to the adapter. The adapter 22, Fig. 3, includes a body 44 provided with a flange 45 for coupling the adapter to a hydrant or tank, and a flange 46 in which is seated a sleeve 47, provided with cam portions 64, 66 and an annular recess 68. Within the body 44 is a spider 52 slidably mounting the rod 61 of a spring-loaded valve 58 urged on to the seat 51 of the sleeve 47. In coupling the nozzle to the adapter, the former is engaged over the sleeve 47 so that the balls 85 ride over the cam surfaces 64, 66 and on to the surface 67 thereof when the balls 96 ride up the surface 64 and on to the portion 65 so as to move the members 91 to positions whereby the sleeve 88 is released. Further, telescoping movement of the nozzle and adapter results in alignment with and seating of the balls 85 in the groove 68. The sleeve 88 is then moved to retain the balls in the groove and effect locking of the nozzle to the adapter. By operating the crank 41, the valve 26 is brought into engagement with the valve 58 so that both valves are opened and the springs 81 react on the sleeve 70 to bring the sealing ring 75 into contact with the valve seat 51. To ensure the proper coupling of the nozzle to the correct adapter, a selector ring 105 on the sleeve 88 and the flange 46 of the adapter 22 have selectively interengageable pins and sockets. In a modification, the sleeve 195, Fig. 13, is provided with enlargements 196 in which are pivoted latch members 203 urged inwardly by spring-loaded balls 212 to engage steps formed in the sleeve 189 to prevent forward movement of the sleeve 195 under the action of the springs 200 and until coupling of the nozzle 121 and adapter 122 is effected. The adapter includes a shroud 169, and guide member 178 held in place against the valve 174 by the valve spring 180.

**Classifications:**

**International (IPC 8-9):** B64F1/28 F16K1/12 F16L37/00 F16L37/23 F16L37/36 F16L37/60 (Advanced/Invention);  
B64F1/00 F16K1/00 F16L37/00 F16L37/28 (Core/Invention)  
**International (IPC 1-7):** F16L29/00 F16L37/22  
**CPC:** B64F1/28 F16K1/12 F16L37/00 F16L37/23 F16L37/36 F16L37/60  
**European:** B64F1/28 F16K1/12 F16L37/00 F16L37/23 F16L37/36 F16L37/60



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| DE1400521 A1       | 19681017         | DE1961P028278      | 19611120         |
| GB1002559 A        | 19650825         | GB19610041368      | 19611120         |

**Priority:**

US19600070815 19601121

**Probable Assignee:** PARKER HANNIFIN CORP

**Assignee(s):** (std): PARKER HANNIFIN CORP

**4) Family number: 4774073 (US5050843A)**

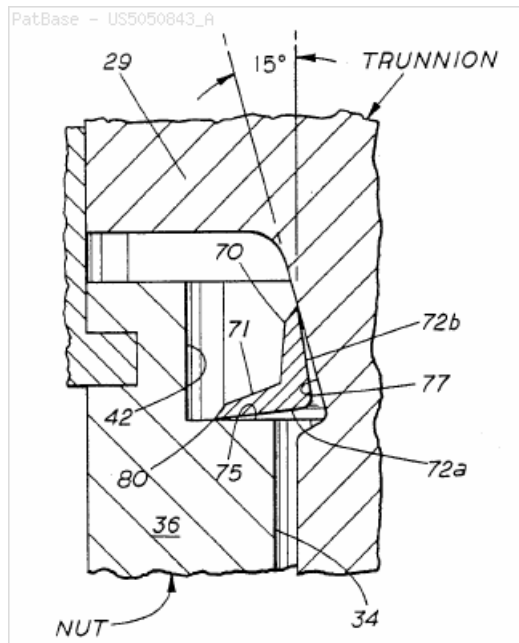
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**Title:** PLUG VALVE WITH METAL-TO-METAL SEALING

**Abstract:** A plug valve with metal-to-metal annular sealing rings with a V shaped cross section to provide a resilient force for sealingly engage with respect to a horizontal sealing surface and a nearly vertical rotatable sealing surface and/or with a vertical sealing surface.

**Classifications:**

**International (IPC 8-9):** F16K41/02 F16K5/04 (Advanced/Invention);  
F16K41/00 F16K5/00 (Core/Invention)  
**International (IPC 1-7):** F16K41/00 F16K5/04  
**CPC:** Y10S285/917 F16K5/0485 F16K41/026  
**European:** F16K41/02B2 F16K5/04J5  
**US:** 251/214 251/312 277/112 277/206R 277/236 277/362 277/387 277/399 285/917



#### Family:

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US5050843 A        | 19910924         | US19900567738      | 19900815         |

#### Priority:

US19900567738 19900815

**Probable Assignee:** MANIFOLD SYSTEMS INC

**Assignee(s):** (std): MANIFOLD SYSTEMS INC

**Assignee(s):** MANIFOLD SYSTEMS INC A CORP OF TX ; DIXON IRON WORKS INC ; DIXON IRON WORKS INC A TEXAS CORP

**Inventor(s):** (std): BROOKS ROBERT T

#### 5) Family number: 8333089 (US4285406A)

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**Title:** Drilling head

**Abstract:** A drilling head includes a tubular body with top, bottom and side openings. A top closure closes the annulus between a portion of the head above the side opening and a drive tube such as a kelly extending through the head. The top closure includes a rotor, adapted to form a non-rotating seal with the kelly, and a stator, with a rotating seal between the stator and rotor. The stator is supported on and releasably connected to the body. The rotor includes a seal tube rotatably supported by inboard bearings on the stator located above the rotating seal. The seal tube has a replaceable rubber stripper to seal with the kelly. An upwardly flaring medial flange on the stripper guides upwardly flowing annulus fluid toward the side opening and away from the rotating seal. The rotor includes an elastomer sandwich drive bushing, rising above the stator into the rotary table, splined to the seal tube and secured to the kelly by slips. A segmented clamp securing the top closure to the body includes more than two segments, for fast actuation, and the segments are guided so that but one motor is required to operate all segments. The segmented clamp securing the top closure stator to the drilling head body is tightened and released by a remote controlled, rotary hydraulic motor driven screw, which is also manually actuatable. The stator has a tapered pin fitting into a conical bowl in the body with spaced upper and lower seals therebetween. The rotating seal is supplied with lubricant from outside the body via passages through the bushing and stator and body, communicating across the pin and bowl between the two seals.

#### Classifications:

**International (IPC 8-9):** E21B3/04 E21B33/08 (Advanced/Invention);

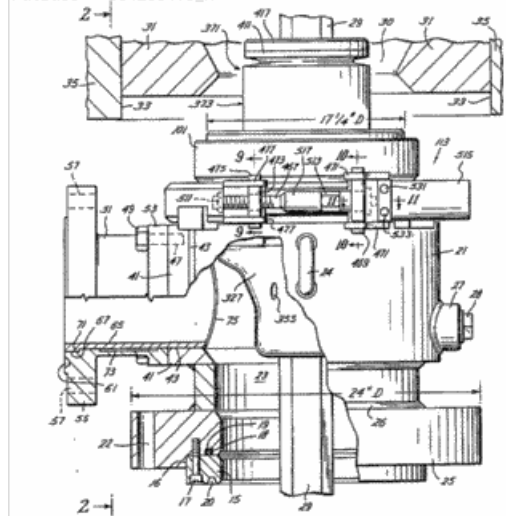
E21B3/00 E21B33/02 (Core/Invention)

**International (IPC 1-7):** E21B3/04

**CPC:** E21B3/04 E21B33/085

**European:** E21B3/04 E21B33/08B

**US:** 175/195 277/343 285/363

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US4285406 A        | 19810825         | US19790069360      | 19790824         |

**Priority:**

US19790069360 19790824

**Probable Assignee:** SMITH INTERNATIONAL**Assignee(s):** (std): SMITH INT ; SMITH INTERNATIONAL**Assignee(s):** SMITH INTERNATIONAL INC**Inventor(s):** (std): GARRETT WILLIAM R ; YOUNG DAVID E**6) Family number: 25195102 (US3309928A)**

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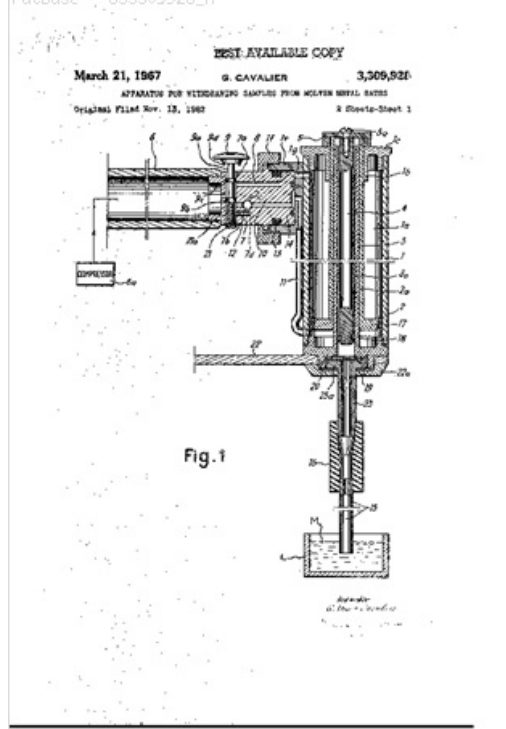
**Title:** APPARATUS FOR WITHDRAWING SAMPLES FROM MOLTEN METAL BATHS

**Abstract:** 986,167. Vacuum pumps. INSTITUT DE RECHERCHES DE LA SIDERURGIE FRANCAISE. Nov. 13, 1962 [Nov. 14, 1961], No. 42773/62. Heading FIN. [Also in Division B3] A sample of molten metal is drawn into a refractory tube by suction means which create and maintain in the tube during the sampling operation a sub-atmosphere pressure which decreases with time. The melt is drawn into the glass or silica tube 15 by a suction piston 4 attached to and driven by a piston 2, which is operated by compressed air supplied through a hand operated valve 7. The volume swept out by the piston 4 is considerably greater than the volume of the tube 15 and the means connecting it to the pump. The speed of ascent of the pistons 2, 4 may be regulated by a throttle screw 12 in the compressed air passage 10. A nickel wire gauze screen 19 prevents entry of molten metal into the pump and 22 is a coloured sight screen. The piston 2 may be driven by an electric motor.

**Classifications:****International (IPC 8-9):** B22D18/06 G01N1/12 G01N1/14

G01N21/67 (Advanced/Invention);

B22D18/06 G01N1/12 G01N1/14 G01N21/62 (Core/Invention)

**International (IPC 1-7):** C21C5/30 G01J3/02 G01N1/10 G01N33/20**CPC:** Y10S73/09 B22D18/06 G01N1/125 G01N1/1409 G01N21/67**European:** B22D18/06 G01N1/12B G01N1/14B G01N21/67**US:** 73/864.54 73/DIG.9

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AT244644 B         | 19660110         | AT19620008907      | 19621113         |
| BE624414 A         | 00000000         |                    | 00000000         |
| DE1266024 B        | 19680411         | DE1962J022636      | 19621112         |
| FR1313201 A        | 19621228         | FR19610878790      | 19611114         |
| FR86587 E          | 19660304         | FR19640991692      | 19641016         |
| GB986167 A         | 19650317         | GB19620042773      | 19621113         |
| US3255634 A        | 19660614         | US19620236804      | 19621113         |
| US3309928 A        | 19670321         | US19660520249      | 19660112         |

**Priority:**

FR19610878790 19611114      US19620236804 19621113      FR19640991692 19641016  
US19660520249 19660112

**Probable Assignee:** SIDERURGIE FSE INST RECH

**Assignee(s):** (std): SIDERURGIE FSE INST RECH

**Assignee(s):** DE RECHERCHES DE LA SIDERURGIE FRANCAISE INST ; INST RECH S DE LA SIDERURGIE F ; INSTITUT DE RECHERCHES DE LA SIDERURGIE FRANCAISE

**Inventor(s):** (std): GILBERT CAVALIER

**Inventor(s):** CAVALIER GILBERT

**7) Family number: 18250222 (GB254655A)**

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**Title:** Improvements in and relating to central lubricating systems

**Abstract:** Channels in steering-apparatus and brake mechanism. A lubricating-device for the bearings associated with the knuckle 12 of a motorvehicle comprises a pipe 33, Fig. 1, extending along the axle 11 and conveying lubricant under pressure, the pipe discharging, through a pressure-absorbing fitting P such as that described in Specification 237,958, [Class 12 (iii), Lubricators and c.and through passages 42, 43 in a cap 34 covering the upper end of the knuckle, into the interior of the knuckle, whence it flows to the various bearings by gravity through a system of passages and pipes, such system being unvented and the parts of the system lying above the bearings having cross-sections sufficiently large to permit flow of lubricant without air blocking and to prevent syphoning. Part of the lubricant fed through the passage 43 flows through holes 44 and an axial bore 45 in the king pin 10 to the lower knuckle bearing 26, while the remainder passes through the upper roller bearing 17 into a trough 18 <1> , whence it drains through a pipe 54 into a tube 55, Fig. 3, within a flowdividing fitting 47. Inturned lips 57 on the tube 55 divert a part of the lubricant flowing through the tube into a pipe 52 leading to the tie-rod bearing 29, the remainder flowing through a pipe 49 to the drag-link bearing 32. The pipe 49, which lies wholly below the lubricant outlet in the bearing 32 and acts as a lubricant trap, may be of small bore. In a modification, lubricant is conveyed to the knuckle from the chassis frame through a conduit embodied in a brake-operating rock shaft, as described in Specification 235,087, a pressure-absorbing fitting being arranged at the inlet to the conduit. In this embodiment, the whole of the lubricant passes through the roller bearing 1'7, a part being then diverted by an intercepting ring fitted on the pin 10 into the bore 45, while the remainder drains into the trough 18 <1> , with which the pipes 49, 52 have independent communication. In a further modification shown in Fig. 6, the supply pipe 33 and fitting P discharge through a passage 81 in the axle into an annular space 79 <1> surrounding the middle of the king pin, whence the lubricant flows through a radial hole 84 to an annular space surrounding a tube 86 fitted in a bore 85 in the pin and having a slotted end 87 protruding above the top of the pin. Part of the lubricant overflows into the tube 86, whence it passes to an annular groove 89 in the lower bearing, and part overflows through the upper bearing 17 to the trough 18 <1> , whence it is distributed to the tierod and drag-link bearings. Lubricant draining from the lower bearing into a well 93 passes into a groove 95 in a brake cam 90, whence it passes through a hole 95 <1> to the key 91. In the form shown in Fig. 9, the supply pipe 33 is provided with two fittings P in parallel, delivering through passages 103, 104 in the axle to separate annular spaces 106, 107 around the king pin. From space 106, lubricant passes through a bore 108 into a bore 109 in the pin, the overflow from which passes through the roller bearing to a pipe 49 leading to the drag-link bearing. From the space 107, lubricant passes through a radial hole into a bore 110 in the pin leading to the lower bearing. Lubricant accumulating in the bore 110 overflows into a tube 112 delivering to the brake structure 111 and also flows through a pipe 114 to the tierod bearing.

**Classifications:**

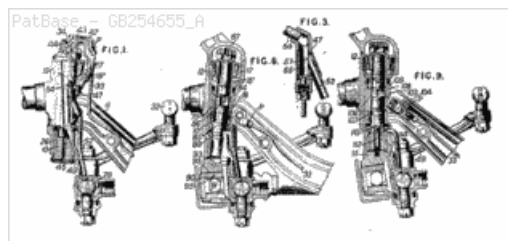
**International (IPC 8-9):** F16N21/00 (Advanced/Invention);

F16N21/00 (Core/Invention)

**International (IPC 1-7):** F16N21/00

**CPC:** F16N21/00

**European:** F16N21/00

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| GB254655 A         | 19260708         | GB19260008534      | 19260329         |

**Priority:**

GB19260008534 19260329

**Probable Assignee:** JOSEPH BIJUR

**Assignee(s):** (std): JOSEPH BIJUR

**8) Family number: 816224 (US3373819A)**

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**Title:** PITLESS WELL UNIT

**Abstract:** ABSTRACT OF THE DISCLOSURE A self-contained unit with valved discharge spool. The spool and drop assembly are positioned and held down independently of the cap by means of hook studs and a strap welded to the hold-down pipe which extends from the spool to the top of the case. The case is provided with slots for the stud hooks and a pocket for the orientation strap. A holddown for a meter shaft is provided at the top of the holddown pipe. The spool is designed to provide passage for motor cables, pressure lines, or other auxiliaries into the well outside the valve and discharge chamber of the spool.

**Classifications:**

**International (IPC 8-9):** E21B33/00 (Advanced/Invention);  
E21B33/00 (Core/Invention)

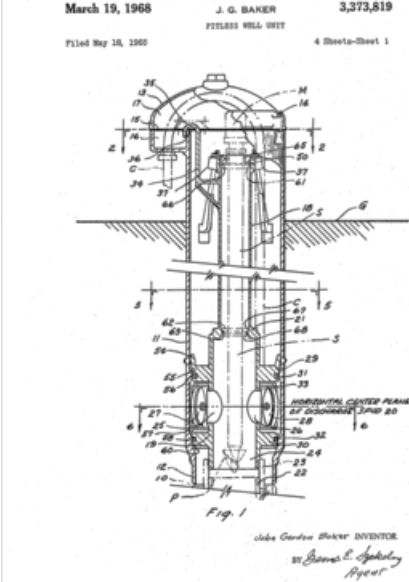
**International (IPC 1-7):** E21B33/04

**CPC:** E21B33/00

**European:** E21B33/00

**US:** 166/85.2 166/88

PatBase - US3373819\_A



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US3373819 A        | 19680319         | US19650456668      | 19650518         |

**Priority:**

US19650456668 19650518

**Probable Assignee:** BAKER MFG CO LLC F K A BAKER ACQUISITION LLC

**Assignee(s):** (std): BAKER MFG CO ; BAKER MFG COMPANY

**Assignee(s):** BAKER MFG CO LLC F K A BAKER ACQUISITION LLC ; BAKER MANUFACTURING COMPANY ; BAKER MFG

**Inventor(s):** (std): BAKER JOHN GORDON ; GORDON BAKER JOHN

**9) Family number: 30016301 (US3313517A)**

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**Title:** GAS EXPANDER TURBINES FOR POWER RECOVERY USE WITH JET TYPE, HOT GAS GENERATORS

**Abstract:** 1,121,153. Gas turbine plant; power plant. WORTHINGTON CORP. Dec. 20, 1965 [April 1, 1965], No. 53983/65. Headings F1G, F1Q and F1T. A turbine comprises an outer casing and an inner casing, a rotor disposed within the inner casing and forming fluid-flow passages in cooperation therewith, there being support means and guide means for independently supporting and guiding the outer casing and the inner casing from a fixed base with freedom for controlled relative movement therebetween, the guide means including locating means for positively locating the outer casing and the inner casing at one common central point. The invention is described with reference to a plant which comprises four power turbines 22, 24, 26, 28 (Fig. 1) each of which is of the double flow type, the shafts of the turbines 22, 24 being aligned and interconnected and connected to an electric generator 30, the shafts of the turbines 26, 28 also being aligned and interconnected and connected to the other side of the electric generator. Each power turbine is supplied with gases from a pair of oppositely disposed gas turbine type gas generators 32, 34, 36, 38, 40, 42, 44, 46 such as modified aircraft gas turbine jet engines. A power turbine 26 is shown in Figs. 5 and 6 and comprises an outer casing 70, an inner casing 72 and a rotor assembly 74 which comprises stub shafts 163, 164 rotatably supported in bearings 206, 242. The turbine is of the double flow type. The rotor comprises spacer discs 158, rotor discs 160 and stub shafts 163, 164 all secured together by means of through-bolts 166. The shaft 164 is connected to the rotor shaft of the adjacent power turbine 28 while the shaft 163 is connected to the shaft of the electric generator 30. The inner casing 72 comprises a toroidal gas inlet structure 84 to which are secured exhaust diffusers 86, 88. The inlet structure has gas inlet members 98, 100 at opposite sides thereof, see Fig. 6, and volute structures 104, 106 extend therefrom within the toroidal structure 84 whereby combustion gases from the combustion gas generators 40, 42 are delivered to the radial inlet vanes 124. The gases flow in opposite directions through the rotor blade assemblies 171, 173, stator guide blades 190, 192 and rotor blades 170, 175, thence through the exhaust diffuser passages 136, 138 into the space between the outer casing 70 and the inner casing 72 to discharge to atmosphere as indicated by arrows 156. Apertures 118 are formed in the volute structures 104, 106 for pressure balancing purposes. The inner casing 72 is supported from base structure by flexible means which comprise four flexible strut structures 350, 352 Fig. 4 (and Fig. 8 not shown). The exhaust diffuser 88 of the inner casing 72 is formed with four integral flanges 342, 344 which are disposed above mounting pads 346, 348 and the flexible strut structures 350, 352 which each comprise a pair of spaced apart vertical, flat plates 358, 360 extend between the flanges and mounting pads. The inner casing 72 is located at its centre by means of a pin 324 which is located within a bore in a boss 327 at the lower part of the toroidal structure, the pins also being located within a bore of a boss 320 which is secured to the base structure 45. The outer casing 70 is also supported from the base structure by means which allow movement. For this purpose flanges 278, 280 (Figs. 2 and 4) extend from the end faces of the outer casing 70 and strut members 294, 296 having ball members 298 at their ends extend between the flanges 278, 280 and members 288, 290 secured to the base structure. The outer casing 70 is positively located at the same

central point as the inner casing 72 by means of a flexible sealing device 326 which is disposed between the outer casing 70 and the boss 320 which is secured to the base structure 45, Figs. 5 and 6. The construction of the sealing device 326 is described with reference to Fig. 9 (not shown). Guide flanges 302, 304 extend from the outer casing 70 as shown in Fig. 6 and are located above sole plates 306 which are secured to the base structure. The flanges 302, 304 engage with guide members 312, 314 secured to the sole plates whereby longitudinal movement of the outer casing 70 is limited at these points but transverse expansion is permitted. Further guide members 398, 400 are secured to the sole plates 306, Fig. 6 and strut members 404, 406 extend between the guide members and the gas inlet transition pieces 92, 94 which form part of the inner casing 72. The strut members 404, 406 extend through openings in the outer casing 70, the openings being sealed by sealing assemblies 414, 416. This construction permits thermal expansion of the inner casing 72 in the transverse and vertical directions. The means by which bearing casing 206 is supported from the exhaust diffuser 88 which forms part of the inner casing 72 is described with reference to Fig. 4 and Fig. 7 (not shown). The bearing casing is formed of upper and lower halves bolted together and integral support flanges 446, 448 project from the lower half of the casing, these flanges co-operating with flanges 450, 452 formed integrally with the exhaust diffuser 88. Clearances are provided to permit thermal expansion of the diffuser 88 in the radially inward direction. The bearing casing 242 is supported from the exhaust diffuser 86 in a similar manner. The bearing 206 is a journal bearing while bearing 242 is a journal and thrust bearing. The bearing casings 206, 242 are guided relative to the exhaust diffusers 88, 86 by means of radial pins 224 which engage sockets formed in the exhaust diffusers.

**Classifications:**

**International (IPC 8-9):** F01D25/26 F01D25/28

F02C6/02 (Advanced/Invention);

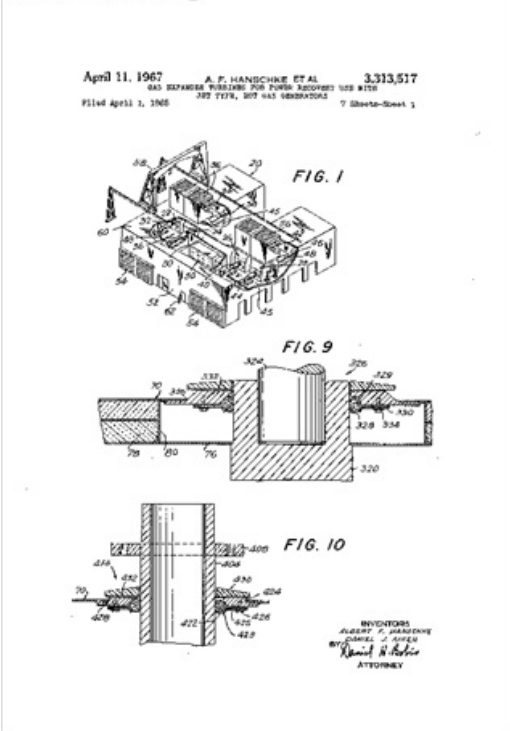
F01D25/24 F01D25/28 F02C6/00 (Core/Invention)

**CPC:** F01D25/26 F01D25/28 F02C6/02 Y02T50/671

**European:** F01D25/26 F01D25/28 F02C6/02 Y02T50/67B

**US:** 415/101 415/119 415/134 415/199.5

PatBase - US3313517\_A



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| BE674620 A         | 19660630         |                    | 19651231         |
| DE1476936 A1       | 19690710         | DE19661476936      | 19660331         |
| GB1121153 A        | 19680724         | GB19650053983      | 19651220         |
| NL6604022 A        | 19661003         | NL19660004022      | 19660328         |
| US3313517 A        | 19670411         | US19650444665      | 19650401         |

**Priority:**

US19650444665 19650401

**Probable Assignee:** WORTHINGTON CORP

**Assignee(s):** (std): WORTHINGTON CORP

**Assignee(s):** EDISON INT ; EDISON INTERNATIONAL INC ; STUDEBAKER WORTHINGTON INC ; STUDEBAKER WORTHINGTON INC A CORP OF DE

**Inventor(s):** (std): JOSEPH AIKEN DANIEL ; HANSCHKE ALBERT F ; FRIEDRICH HANSCHKE ALBERT ; AIKEN DANIEL J

**10) Family number: 1378376 (US4013363A)**

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**Title:** Vesicular film advancing module

**Abstract:** A film advancing module which co-operates with a basic processing module to duplicate a master microfiche. The film advancing module includes a film drawing station for drawing a continuous strip of vesicular microfilm from the basic processing module into the film advancing module, a film cutting station for separating an exposed film segment from the continuous strip of microfilm, a film heating station for heating the film segment, a film cooling station for cooling the film segment, a film clearing station for clearing the film segment and a film receiving station for collecting the film segment. The film heating and cooling stations are positioned to define a generally S-shaped path of travel which tends to remove any curl in the film and all the stations are positioned to define a relatively compact path of travel for the film segment. The film cooling and clearing stations are connected in series to a source of cooling air to conduct heat away from the film segment.

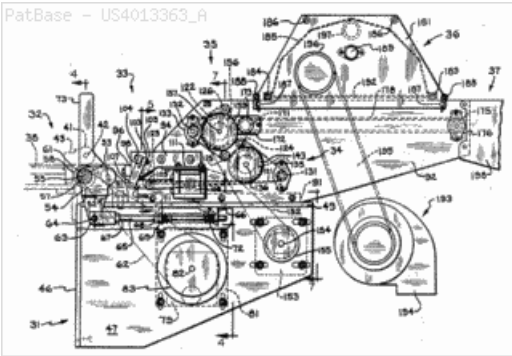
**Classifications:**

**International (IPC 8-9):** G03D13/00 (Advanced/Invention);

G03D13/00 (Core/Invention)

**International (IPC 1-7):** G03B27/04

CPC: G03D13/002  
European: G03D13/00D  
US: 355/123 355/97



Family:

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US4013363 A        | 19770322         | US19750597443      | 19750721         |

Priority:

US19750597443 19750721

Probable Assignee: MAGNAGARD EQUIPMENT MANUFACTUR

Assignee(s): (std): MAGNAGARD EQUIPMENT MANUFACTUR

Assignee(s): MAGNAGARD EQUIPMENT MFG CORP

Inventor(s): (std): PUTNAM DEAN H

11) Family number: 4544411 (US4304310A)

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Title: Drilling head

**Abstract:** A drilling head comprises a tubular body adapted for connection above a well head and having a removable side outlet with a replaceable wear bushing. An assembly removably secured in the head includes a stator and rotor with bearing means and rotating seal means therebetween. A replaceable tubular, kelly seal boot or stripper carried by the rotor includes an enlarged upper end which diverts drilling mud away from the rotating seal and toward the side outlet.

Classifications:

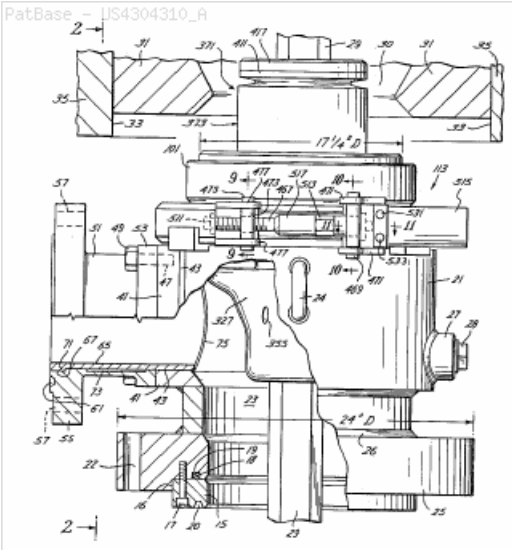
**International (IPC 8-9):** E21B3/04 E21B33/08 (Advanced/Invention); E21B3/00 E21B33/02 (Core/Invention)

**International (IPC 1-7):** E21B3/04

**CPC:** E21B3/04 E21B33/085

**European:** E21B3/04 E21B33/08B

**US:** 166/84.3 175/195 277/31 277/322 277/343 285/16



Family:

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US4304310 A        | 19811208         | US19790069341      | 19790824         |
| US4480703 A        | 19841106         | US19810321937      | 19811116         |

Priority:

US19790069341 19790824 US19810321937 19811116

Probable Assignee: SMITH INTERNATIONAL

Assignee(s): (std): SMITH INT ; SMITH INTERNATIONAL

Assignee(s): SMITH INTERNATIONAL INC

Inventor(s): (std): GARRETT WILLIAM R

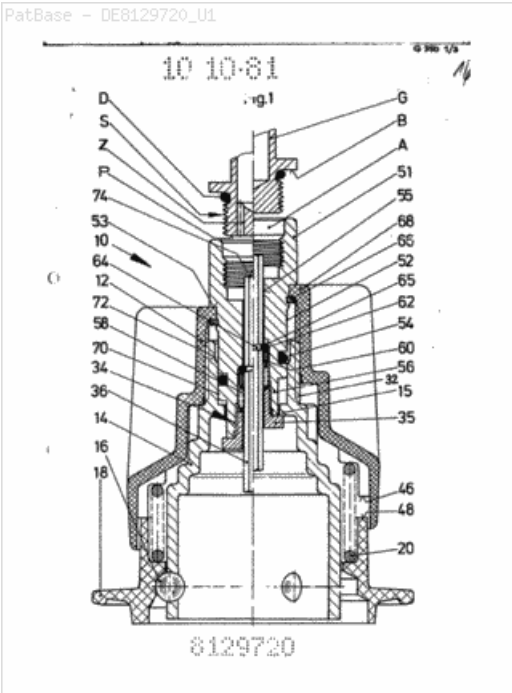
12) Family number: 16359503 (DE8129720U1)

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**Abstract:** Source: DE8129720U1 [DE] (Claim 1) Hochdruck-Anschluss Schutzansprueche 1. Hochdruck-Anschluss (10) mit einer gefederten Steck-Kugel- kupplung (16, 18) zur Anbringung an einem Behaelterventil eines Fluessiggasbehaelters, mit einer auf einem Gehaeuse (14) schraubenden Kappe (12), deren Axialstellung die Betaetigbarkeit der Kugelpupplung (16,18) bestimmt, und mit einer AufnahmeEinrichtung zur Verbindung mit einem Geraete-Anschluss (G), der einen mit einem gehaeuseseitigen Gewindeverschraubbaren Stutzen (S) mit einer Pressflaeche (P) hat, die dabei am Kopf (74) eines Betaetigungsgliedes (36) zur Anlage kommen kann, das im Gehaeuse (14) zentrisch angeordnet sowie laengsverschieblich gefuehrt ist und auf den Stoessel des Behaelterventils wirkt, dadurch g e k e n n z e i c h n e t, dass Kappe (12) und Gehaeuse (14) ueber einen Fuehrungskoeper (51) miteinander verbunden sind, dessen Oberteil eine mit Gewinde versehene Aufnahme (A) hat, in welche der Kopf (74) des Betaetigungsgliedes (36) ragt.

**Machine translation:** (Claim 1) High pressure Schutzansprueche first High pressure (10) with a spring-loaded plug-ball coupling (16, 18) for attaching to a Behaelterventil one Fluessiggasbehaelters, with one on a housing (14) screwing cap (12), whose axial position of the operability of the ball coupling (16, 18) determined, and with a recording device to connect to a device port (G), one gehaeuseseitigen a Gewindeverschraubbaren socket (S) with a pressing surface (P) is that while the head (74) one Betaetigungsgliedes (36) for system may come, which is in the housing (14) arranged concentrically and longitudinally displaceably guided and on the plunger of the Behaelterventils acts, wherein said cap (12) and housing (14) over one Fuehrungskoeper (51) are connected, the upper part of one threaded intake (A), which protrudes into the head (74) of Betaetigungsgliedes (36).

**Classifications:**  
**International (IPC 8-9):** F17C13/04 (Advanced/Invention);  
F17C13/04 (Core/Invention)  
**International (IPC 1-7):** F17C13/04



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| DE8129720 U1       | 19830324         | DE19810029720U     | 19811010         |

**Priority:**

DE19810029720U 19811010

**Probable Assignee:** SCHULZ AND RACKOW GMBH 3554 GLADENBACH DE

**Assignee(s):** SCHULZ AND RACKOW GMBH 3554 GLADENBACH DE

**13) Family number: 44817547 (US2010081965A)**

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**Title:** NEEDLE BIOPSY DEVICE

**Abstract:** A device for needle biopsy is provided. The device includes a handle member having proximal and distal portions. A proximal handle member is disposed to the proximal portion of the handle member and a distal handle member is disposed to the distal portion of the handle member. A sheath lumen is disposed within the handle member and extends from the distal portion of the handle member. A needle housing member is partially disposed to the proximal portion of the handle member and a needle is disposed within the sheath lumen. A plurality of protrusions are disposed upon the needle.

**Classifications:**

**International (IPC 8-9):** A61B1/00 A61B1/313 A61B10/00 A61B10/02

A61B10/04 A61B17/00 A61B17/20 A61B17/34 A61B19/00 A61B8/12

A61B8/14 A61B90/00 A61F2/848 A61F2/95 A61L29/04 A61M1/00

A61M25/00 A61M25/01 A61M5/158 A61M5/32 (Advanced/Invention);

A61B10/02 A61B17/00 A61B17/34 A61B19/00 A61B90/00 A61M25/00

A61M25/01 (Advanced/Non-invention);

A61B10/00 A61B10/02 A61B17/20 A61L29/00 A61M5/14

A61M5/32 (Core/Invention)

**CPC:** A61B17/1114 A61B2017/1139 A61B2017/347 A61F2/848 A61F2/88

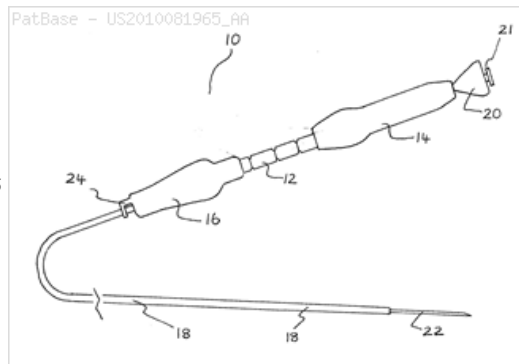
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A61B2017/3425 A61B10/0266 A61B2017/00424 A61B2090/3987

A61B2017/3413 A61B10/0233 A61B19/54 A61B17/3417 A61B2017/00323

A61B2017/00331 A61B2017/3405 A61B2019/4805 A61B2019/5425  
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A61B2017/00991 A61B2090/0801 A61B2090/3925 A61B10/04 A61B90/39  
**European:** A61B10/04 A61B17/11D A61F2/966 K61B10/02P8  
K61B10/04N K61B17/00G2 K61B17/00K K61B17/11Q K61B17/34D2  
K61B17/34K K61B19/48B K61B19/54F K61B19/54V K61F2/04A  
K61F2/848 K61F2/88  
**US:** 1/1 600/562 600/567 600/567P 604/164.08 604/22 604/22S 606/108  
**JP F-Term:** 4C029 4C061 4C161 4C161/AA01 4C161/AA07 4C161/GG15  
4C161/JJ01 4C601 4C601/EE11 4C601/FE01 4C601/FF06 4C601/EE09  
4C601/EE10 4C601/FF03 4C601/DD30 4C601/EE05 4C601/FF05  
4C601/FF04 4C160 4C160/MM43 4C160/NN04 4C161/BB08 4C161/CC06  
4C161/DD00 4C161/HH51 4C161/NN05 4C161/WW16 4C167  
4C167/AA39 4C167/AA42 4C167/AA56 4C167/BB02 4C167/BB05  
4C167/BB07 4C167/BB15 4C167/BB26 4C167/BB39 4C167/BB40  
4C167/BB52 4C167/CC22 4C267 4C601/GA20 4C601/GA26  
**JP F-Index:** A61B1/00/334/D A61B1/00/650 A61B1/018/515  
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A61B8/12 A61B10/02/110/K A61B10/02/300/Z A61B1/00/530 A61B8/14 A61B10/00/103/A A61B10/02/110 A61B1/00/300/F  
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# Family:

| Publication number | Publication date | Application number | Application date |
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| AU2012339659 AA    | 20130523         | AU20120339659      | 20121114         |
| AU2012339659 BB    | 20170119         | AU20120339659      | 20121114         |
| AU2015207938 AA    | 20160407         | AU20150207938      | 20150731         |
| AU2015207938 BB    | 20170112         | AU20150207938      | 20150731         |
| CA2739391 AA       | 20110401         | CA20092739391      | 20091001         |
| CA2744612 AA       | 20110525         | CA20092744612      | 20091124         |
| CA2744612 C        | 20180417         | CA20092744612      | 20091124         |
| CA2856060 AA       | 20140515         | CA20122856060      | 20121114         |
| CA2899073 AA       | 20160324         | CA20152899073      | 20150730         |
| CA2899073 C        | 20180703         | CA20152899073      | 20150730         |
| CA2995281 AA       | 20100603         | CA20092995281      | 20091124         |
| CN105435354 A      | 20160330         | CN201510615777     | 20150924         |
| CN105435354 B      | 20190329         | CN201510615777     | 20150924         |
| CN204336970 U      | 20150520         | CN201290001094U    | 20121114         |
| CN205163193 U      | 20160420         | CN201520271134U    | 20121114         |
| EP2364111 A2       | 20110914         | EP20090818508      | 20091001         |
| EP2364111 A4       | 20131023         | EP20090818508      | 20091001         |
| EP2367481 A2       | 20110928         | EP20090829751      | 20091124         |
| EP2367481 A4       | 20130417         | EP20090829751      | 20091124         |
| EP2367481 B1       | 20161109         | EP20090829751      | 20091124         |
| EP2779908 A1       | 20140924         | EP20120805482      | 20121114         |
| EP2779908 B1       | 20190403         | EP20120805482      | 20121114         |
| EP3000422 A1       | 20160330         | EP20150186380      | 20150923         |
| EP3153107 A1       | 20170412         | EP20160196535      | 20091124         |
| JP2012504469 T2    | 20120223         | JP20110530227T     | 20091001         |
| JP2012509747 T2    | 20120426         | JP20110538671T     | 20091124         |
| JP2015107324 A2    | 20150611         | JP20140236354      | 20141121         |
| JP2015205206 A2    | 20151119         | JP20150132613      | 20150701         |
| JP2015501679 T2    | 20150119         | JP20140542405T     | 20121114         |
| JP2016067915 A2    | 20160509         | JP20150165577      | 20150825         |
| JP2017070775 A2    | 20170413         | JP20160234906      | 20161202         |
| JP5755564 B2       | 20150729         | JP20110530227T     | 20091001         |
| JP5774489 B2       | 20150909         | JP20110538671T     | 20091124         |
| JP6055482 B2       | 20170111         | JP20140542405T     | 20121114         |
| JP6069438 B2       | 20170201         | JP20150165577      | 20150825         |
| JP6138747 B2       | 20170531         | JP20140236354      | 20141121         |
| US2010081965 AA    | 20100401         | US20080243367      | 20081001         |
| US2010121218 AA    | 20100513         | US20090607636      | 20091028         |
| US2011190662 AA    | 20110804         | US20110029593      | 20110217         |
| US2012116248 AA    | 20120510         | US20110297766      | 20111116         |
| US2015012008 AA    | 20150108         | US20140494685      | 20140924         |
| US2015164487 AA    | 20150618         | US20150630742      | 20150225         |
| US2016066897 AA    | 20160310         | US20150943587      | 20151117         |
| US2016206294 AA    | 20160721         | US20160084851      | 20160330         |
| US2018001057 AA    | 20180104         | US20170708882      | 20170919         |
| US2018235585 AA    | 20180823         | US20180886293      | 20180201         |
| US8968210 BB       | 20150303         | US20090607636      | 20091028         |
| US9186128 BB       | 20151117         | US20080243367      | 20081001         |
| US9332973 BB       | 20160510         | US20110297766      | 20111116         |
| US9782565 BB       | 20171010         | US20140494685      | 20140924         |
| US9913630 BB       | 20180313         | US20150630742      | 20150225         |
| US10076316 BB      | 20180918         | US20150943587      | 20151117         |
| WO10039955 A2      | 20100408         | WO2009US59226      | 20091001         |
| WO10039955 A3      | 20100701         | WO2009US59226      | 20091001         |
| WO10062895 A2      | 20100603         | WO2009US65705      | 20091124         |
| WO10062895 A3      | 20100826         | WO2009US65705      | 20091124         |

WO13112203 A1 20130823 WO2011056084 20111116

**Priority:**

|                |          |                 |          |                |          |
|----------------|----------|-----------------|----------|----------------|----------|
| US20080243367  | 20081001 | US20080117966P  | 20081126 | US20090152746P | 20090216 |
| US20090152741P | 20090216 | JP20110530227   | 20091001 | JP20110530227T | 20091001 |
| WO2009US59226  | 20091001 | US20090607636   | 20091028 | CA20092744612  | 20091124 |
| EP20090829751  | 20091124 | JP20110538671T  | 20091124 | WO2009US65705  | 20091124 |
| US20100305304P | 20100217 | US20100305396P  | 20100217 | US20110029593  | 20110217 |
| US20110297766  | 20111116 | CN201290001094U | 20121114 | JP20140542405T | 20121114 |
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| US20150943587  | 20151117 | US20160084851   | 20160330 | JP20160234906  | 20161202 |
| US20170708882  | 20170919 | US20180886293   | 20180201 | CA20182744612  | 20180227 |

**Probable Assignee:** BOSTON ENDOSCOPIC ENGINEERING CORP

**Assignee(s):** (std): BOSTON ENDOSCOPIC ENGINEERING ; MCWEENEY JOHN ; BOSTON ENDOSCOPIC ENGINEERING CORP ; KELLY MICHAEL ; KELLY MICHAEL ; COVIDIEN LP ; COVIDIEN LLP ; MURPHY BRIAN ; MUGAN JOHN ; BEACON ENDOSCOPIC CORP

**Assignee(s):** BEACON ENDOSCOPIC LLC ; BEACON ENDOSCIPIC CORP ; MCWEENEY JOHN O ; COVIDIEN LP15 HAMPSHIRE STREETMANSFIELDMA02048US

**Inventor(s):** (std): MCWEENEY JOHN ; MURPHY BRIAN ; MUGAN JOHN ; KELLY MICHEAL ; KELLY MICHAEL ; MCWEENEY JOHN O ; JOHN MCWEENEY ; BRIAN MURPHY ; JOHN MUGAN ; MCWHINNEY J O ; KELLY MICHAEL E ; MICHAEL KELLY

**Inventor(s):** KELLY MICHAELIE ; MCWEENEY JOHNUS

**Agent(s):** SPRUSON AND FERGUSON; RIDOUT AND MAYBEE LLP; OSLER HOSKIN AND HARCOURT LLP; MOORE BARRY; MASCHIO ANTONIO; HOFFMANN EITL; SOAMES CANDIDA JANE; MORGAN MARC; BROWN RUDNICK LLP; LEONARDO MARK S ET AL; LEONARDO MARK S

**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

**14) Family number: 59224637** (US2015129557A)

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**Title:** ORBITAL WELDER WITH FLUID COOLED HOUSING

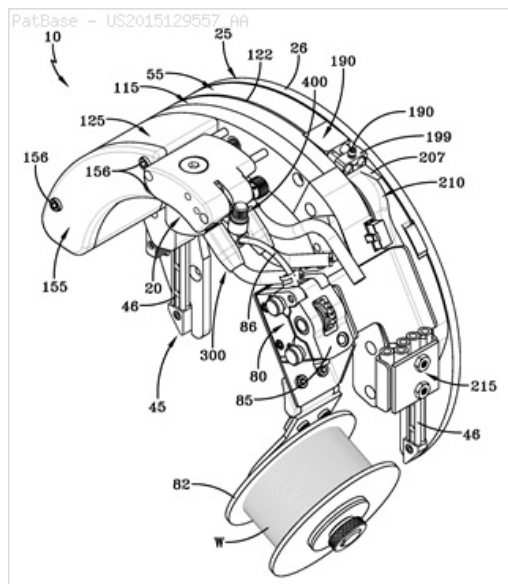
**Abstract:** A welding system comprising a frame having a curved profile configured to at least partially surround a cylindrical work piece, a welding torch supported on the frame a motor supported on the frame and extending outward therefrom the motor being connected to at least one of the frame around the welding torch to move the welding torch relative to the workpiece a motor housing in which at least a portion of the motor is received, the motor housing defining a cooling receiver a cooling assembly adapted to circulate a coolant through the housing, the cooling assembly including a supply line and a return line connected to a cooling insert, the cooling insert being received in the cooling receiver, the cooling insert defining a cooling passage through which the coolant is circulated; wherein the supply line and return line are sealingly attached to the cooling insert with the motor housing.

**Classifications:**

**International (IPC 8-9):** B23K37/00 B23K37/02 B23K9/028 B23K9/173 B23K9/32 H02K5/20 H05K5/00 (Advanced/Invention)

**CPC:** B23K37/003 B23K9/0286 B23K9/173 B23K9/32 B23K37/0217 B23K37/0276 B23K37/0282 H02K5/20 B23K2101/06

**US:** 219/136 219/61.7



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| CN105722628 A      | 20160629         | CN201480061441     | 20141112         |
| DE212014000214 U1  | 20160811         | DE201421000214U    | 20141112         |
| US2015129557 AA    | 20150514         | US20140177283      | 20140211         |
| WO15071733 A1      | 20150521         | WO2014IB02414      | 20141112         |

**Priority:**

|                |          |               |          |               |          |
|----------------|----------|---------------|----------|---------------|----------|
| US20130903089P | 20131112 | US20140177283 | 20140211 | WO2014IB02414 | 20141112 |
|----------------|----------|---------------|----------|---------------|----------|

**Probable Assignee:** LINCOLN GLOBAL INC

**Assignee(s):** (std): LINCOLN GLOBAL INC  
**Assignee(s):** LINCOLN GLOBAL  
**Inventor(s):** (std): MILLER VICTOR ; MILLER VICTOR B ; SNEAD JAMIL ; SNEAD JAMIL C  
**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 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

**15) Family number: 42869709** (US2009025930A)

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**Title:** CONTINUOUS FLOW DRILLING SYSTEMS AND METHODS

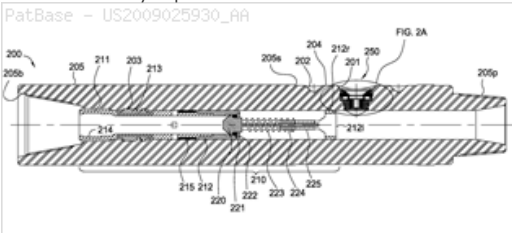
**Abstract:** In one embodiment, a method for drilling a wellbore includes injecting drilling fluid into a top of a tubular string disposed in the wellbore at a first flow rate. The tubular string includes: a drill bit disposed on a bottom thereof, tubular joints connected together, a longitudinal bore therethrough, and a port through a wall thereof. The drilling fluid exits the drill bit and carries cuttings from the drill bit. The cuttings and drilling fluid (returns) flow to the surface via an annulus defined between the tubular string and the wellbore. The method further includes rotating the drill bit while injecting the drilling fluid; remotely removing a plug from the port, thereby opening the port; and injecting drilling fluid into the port at a second flow rate while adding a tubular joint or stand of joints to the tubular string. The injection of drilling fluid into the tubular string is continuously maintained between drilling and adding the joint or stand to the drill string. The method further includes remotely installing a plug into the port, thereby closing the port. The first and second flow rates may be substantially equal or different.

**Classifications:**

**International (IPC 8-9):** E21B17/05 E21B17/18 E21B19/16 E21B21/00 E21B21/02 E21B21/10 E21B21/12 E21B33/00 E21B34/00 E21B43/00 E21B7/00 (Advanced/Invention); E21B34/00 (Advanced/Non-invention); E21B19/00 E21B21/00 E21B33/00 E21B34/00 E21B7/00 (Core/Invention)

**CPC:** E21B7/00 E21B21/002 E21B19/16 E21B21/10 E21B21/106 E21B2034/005 E21B17/18 E21B21/12

**European:** E21B19/16 E21B21/10 E21B21/10S E21B21/12 P21B34/00F  
**US:** 1/1 166/192 166/192S 166/244.1 166/244.100P 166/316 166/319 166/324 166/332.1 166/54 166/54S 166/57 166/77.1 166/95.1 175/162 175/207 175/218 175/324 175/57 175/57S 175/65



**Family:**

| Publication number | Publication date | Application number | Application date |
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| AT538285 E         | 20120115         | AT20080782411T     | 20080725         |
| AU2008282452 AA    | 20090205         | AU20080282452      | 20080725         |
| AU2008282452 BB    | 20120308         | AU20080282452      | 20080725         |
| AU2011203647 AA    | 20110714         | AU20110203647      | 20110105         |
| AU2011203647 BB    | 20141204         | AU20110203647      | 20110105         |
| AU2012203290 AA    | 20120621         | AU20120203290      | 20120604         |
| AU2012203290 BB    | 20140403         | AU20120203290      | 20120604         |
| AU2014202900 AA    | 20140619         | AU20140202900      | 20140528         |
| AU2014202900 BB    | 20160526         | AU20140202900      | 20140528         |
| AU2014203078 AA    | 20140703         | AU20140203078      | 20140605         |
| AU2014203078 BB    | 20160519         | AU20140203078      | 20140605         |
| AU2016219599 AA    | 20160908         | AU20160219599      | 20160824         |
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| CA2694482 C        | 20130528         | CA20082694482      | 20080725         |
| CA2784593 AA       | 20110714         | CA20112784593      | 20110105         |
| CA2784593 C        | 20150414         | CA20112784593      | 20110105         |
| CA2809156 AA       | 20090205         | CA20082809156      | 20080725         |
| CA2809156 C        | 20151208         | CA20082809156      | 20080725         |
| CA2809159 AA       | 20090205         | CA20082809159      | 20080725         |
| CA2809159 C        | 20150317         | CA20082809159      | 20080725         |
| CA2846749 AA       | 20110714         | CA20112846749      | 20110105         |
| CA2846749 C        | 20160628         | CA20112846749      | 20110105         |
| DE602008012212 D1  | 20120308         | DE200860012212T    | 20080725         |
| DE602008046348 D1  | 20161027         | DE200860046348T    | 20080725         |
| DE602008046349 D1  | 20161027         | DE200860046349T    | 20080725         |
| DE602008049782 D1  | 20170524         | DE200860049782T    | 20080725         |
| DE602011006206 D1  | 20140528         | DE201160006206T    | 20110105         |
| DE602011035603 D1  | 20170413         | DE201160035603T    | 20110105         |
| DK2415960 T3       | 20170724         | DK20110187371T     | 20080725         |
| DK2532828 T3       | 20161219         | DK20080182726T     | 20080725         |
| DK2532829 T3       | 20161219         | DK20080182736T     | 20080725         |
| EP2179124 A2       | 20100428         | EP20080782411      | 20080725         |
| EP2179124 B1       | 20111221         | EP20080782411      | 20080725         |
| EP2415960 A2       | 20120208         | EP20110187371      | 20080725         |
| EP2415960 A3       | 20131106         | EP20110187371      | 20080725         |
| EP2415960 B1       | 20170412         | EP20110187371      | 20080725         |
| EP2521835 A2       | 20121114         | EP20110703292      | 20110105         |
| EP2521835 B1       | 20140416         | EP20110703292      | 20110105         |
| EP2532828 A2       | 20121212         | EP20120182726      | 20080725         |
| EP2532828 A3       | 20131106         | EP20120182726      | 20080725         |
| EP2532828 B1       | 20160914         | EP20120182726      | 20080725         |

|                 |          |               |          |
|-----------------|----------|---------------|----------|
| EP2532829 A2    | 20121212 | EP20120182736 | 20080725 |
| EP2532829 A3    | 20130130 | EP20120182736 | 20080725 |
| EP2532829 B1    | 20160914 | EP20120182736 | 20080725 |
| EP2757228 A1    | 20140723 | EP20140164811 | 20110105 |
| EP2757228 B1    | 20170301 | EP20140164811 | 20110105 |
| US2009025930 AA | 20090129 | US20080180121 | 20080725 |
| US2011155379 AA | 20110630 | US20110984429 | 20110104 |
| US2012061087 AA | 20120315 | US20110227260 | 20110907 |
| US2014144706 AA | 20140529 | US20140155083 | 20140114 |
| US2014182943 AA | 20140703 | US20140196026 | 20140304 |
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| US8627890 BB    | 20140114 | US20110984429 | 20110104 |
| US8720545 BB    | 20140513 | US20110227260 | 20110907 |
| US9151124 BB    | 20151006 | US20140196026 | 20140304 |
| US9416599 BB    | 20160816 | US20140155083 | 20140114 |
| WO09018173 A2   | 20090205 | WO2008US71261 | 20080725 |
| WO09018173 A3   | 20090402 | WO2008US71261 | 20080725 |
| WO11085031 A2   | 20110714 | WO2011US20261 | 20110105 |
| WO11085031 A3   | 20120412 | WO2011US20261 | 20110105 |

#### Priority:

|                |          |                |          |               |          |
|----------------|----------|----------------|----------|---------------|----------|
| US20070952539P | 20070727 | US20070973434P | 20070918 | AU20080282452 | 20080725 |
| EP20080782411  | 20080725 | EP20110187371  | 20080725 | CA20082809156 | 20080725 |
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| US20100292607P | 20100106 | US20110984429  | 20110104 | AU20110203647 | 20110105 |
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**Title:** REDUNDANT ELECTRICAL ARCHITECTURE FOR PHOTOVOLTAIC MODULES

**Abstract:** One example embodiment includes a PV module comprising a conductive backsheet, a substantially transparent front plate, a plurality of PV cells, a plurality of conductive spacers, and a power conversion device. The PV cells can be disposed between the conductive backsheet and the front plate and can be arranged in a plurality of rows. The PV cells within each row can be connected to each other in parallel and the rows can be connected in series. The PV cells can be interconnected between the conductive spacers. The power conversion device can be redundantly connected to the PV cells via a last conductive spacer connected to a last row. The power conversion device can substantially maintain a maximum peak power of the PV module and can convert a lower voltage collectively generated by the PV cells to a predetermined stepped up voltage greater than or equal to 12 volts.

#### Classifications:

**International (IPC 8-9):** B05D3/06 B05D5/00 B23K26/00 B29C59/16 B32B37/00 E06B7/08 F24J2/16 F24J2/46 F24J2/52 G01D18/00 G01R27/08 G01R31/40 G02B7/183 G05B15/02 G05F1/46 G05F1/67 G06F1/26 G06F17/50 H01L21/00 H01L21/02 H01L25/00 H01L31/00 H01L31/02 H01L31/0203 H01L31/0236 H01L31/032 H01L31/04 H01L31/042 H01L31/048 H01L31/05 H01L31/052 H01L31/054 H01L31/18 H01L51/40 H02J1/00 H02J3/38 H02J3/46 H02J7/35 H02M7/00 H02N6/00 H02S10/00 H02S20/00 H02S20/30 H02S30/10 H02S40/22 H02S40/30 H02S40/32 H02S40/34 H02S40/36 H02S40/38 H02S50/00 H02S50/10 H02S50/15 H02S99/00 (Advanced/Invention);

F24J2/00 F24J2/54 H01L31/00 H01L31/02 H01L31/048 H01L31/05  
H01R4/24 H02J1/12 H02J3/38 H02M7/00 H02S30/10  
H02S40/34 (Advanced/Non-invention);  
B05D5/00 B32B37/00 E06B7/02 G01D18/00 G05B15/02 G06F1/26  
G06F17/50 H01L31/0264 H01L31/04 H01L31/042 H01L31/052  
H01L31/18 (Core/Invention);  
H02J1/10 (Core/Non-invention)

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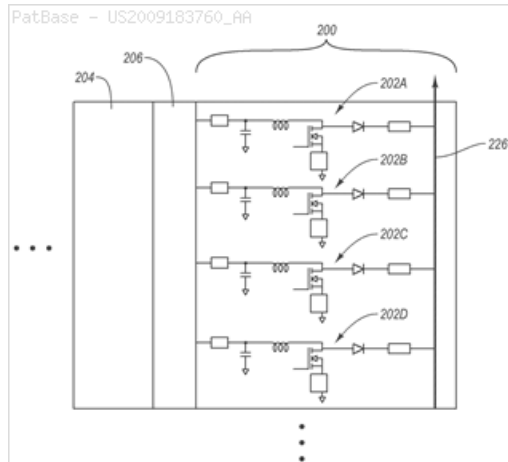
**CPC:** H01L31/022425 E06B7/082 E06B2009/2476 Y02B10/20  
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H01L31/042 B32B7/02 B32B15/04 B32B15/18 B32B15/20 B32B27/06  
B32B27/304 B32B2307/416 H01L31/0508 Y02P70/521 E06B7/08  
B32B37/02 B32B37/12 B32B38/0004 B32B38/06 B32B2310/0843  
B32B2311/00 B32B2311/24 B32B2367/00 B32B2457/12 H01L31/0322  
H01L31/0392 H01L31/206 H01L31/035281 H01R4/2475 H02J3/383  
H02S50/00 H02S50/10 Y02E10/563 Y10T307/707 H02S20/22 H02S50/15  
Y02E10/56 H02J7/35 H02S40/32 H01L31/02021 H02M7/003 H02S40/34  
Y02E10/58 H01L31/03923 H01L31/03925 H01L31/03928 H02S30/20  
Y02B10/10 Y10T307/549 H01L31/0547 H01L31/05 H02S40/36  
H01L31/02008 H01L31/048 H02J3/46 H02J3/385 H01L31/0504 H02S30/10  
H02S40/38 Y02E10/50 G02B7/183 H01L31/0549 H02S20/00 H02S20/30  
H02S40/22 Y02E10/47 Y02E10/52 H01L31/02366 F24S25/13 F24S25/50  
F24S2025/013 F24S2030/16 F24S25/20 F24S2025/801 F24S2020/14  
H01L31/18 F24S23/77 F24S25/16 F24S25/35 F24S25/37 F24S25/632 F24S25/65 F24S25/70 F24S40/80 F24S40/85 F24S2020/16  
F24S2025/803 F24S2025/807 Y02B10/12

**European:** B32B37/02 E06B7/08 E06B7/082 F24J2/16 F24J2/46B28 F24J2/52A20C2 F24J2/52A20D F24J2/52A30 F24J2/52A4B4  
F24J2/52A4B6 F24J2/52A8F G02B7/183 H01L31/0236 H01L31/02E2B H01L31/02H2B H01L31/032C H01L31/0376B H01L31/0392  
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Y02E10/47 Y02E10/50 Y02E10/52 Y02E10/54B Y02E10/54N Y02E10/56

**US:** 1/1 136/244 136/244S 136/246 136/249 136/251 136/252 136/252S 136/256 136/259 136/262 156/250 156/250S  
219/121.66 219/121.660P 219/121.660S 219/121.69 219/121.690S 250/252.1 250/252.100S 257/E31.027 257/E31.027S  
257/E31.054 257/E31.127 257/E31.127S 264/446 264/446P 307/126 307/52 307/71 307/71S 307/82 324/679 324/679S 427/532  
427/532S 427/554 427/554S 438/15 438/17 438/17S 438/59 438/62 438/66 438/66S 438/66S 438/67 438/71 438/84  
438/84P 438/89 52/473 52/473S 700/275 700/275P 700/286 700/286S 703/1 703/1S

**JP F-Term:** 5F151 5F151/JA02 5F151/JA07 5F151/KA03 5F151/EA02 5F151/JA03 5F151/JA04 5F151/JA05 5F151/JA09 5F151/KA02  
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5G503/BA01 5G503/BB01 5G503/DA07 5G503/GB06

**JP F-Index:** H01L31/04/R H01L31/04/562 H01L31/04/570 G05F1/67/A H02S10/00 H02S40/30 H01L31/04/500 H02S40/32  
H02S40/34 H02S40/36 H02J3/38/130 H02J7/35/K



#### Family:

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|--------------------|------------------|--------------------|------------------|
| CN101978510 A      | 20110216         | CN200980109824     | 20090121         |
| CN101978510 B      | 20120509         | CN200980109824     | 20090121         |
| CN102484154 A      | 20120530         | CN201080036349     | 20100615         |
| CN102484154 B      | 20141224         | CN201080036349     | 20100615         |
| CN104736943 A      | 20150624         | CN201380051806     | 20130930         |
| CN104736943 B      | 20170811         | CN201380051806     | 20130930         |
| CN105637758 A      | 20160601         | CN201480051361     | 20140821         |
| DE602012038781 D1  | 20171130         | DE201260038781T    | 20121031         |
| EP2235755 A2       | 20101006         | EP20090702762      | 20090121         |
| EP2235755 A4       | 20130724         | EP20090702762      | 20090121         |
| EP2443666 A2       | 20120425         | EP20100790069      | 20100615         |
| EP2443666 A4       | 20130605         | EP20100790069      | 20100615         |
| EP2774263 A1       | 20140910         | EP20120846494      | 20121031         |
| EP2774263 A4       | 20150121         | EP20120846494      | 20121031         |
| EP2774263 B1       | 20171018         | EP20120846494      | 20121031         |
| EP2911263 A2       | 20150826         | EP20150158419      | 20100615         |
| EP2911263 A3       | 20151014         | EP20150158419      | 20100615         |
| EP3036829 A1       | 20160629         | EP20140838225      | 20140821         |
| EP3036829 A4       | 20170809         | EP20140838225      | 20140821         |
| IN00387DN2012 A    | 20150821         | IN2012DN00387      | 20120113         |
| IN02615DN2015 A    | 20150918         | IN2015DN02615      | 20150331         |
| JP2012530382 T2    | 20121129         | JP20120516209T     | 20100615         |
| JP2015092829 A2    | 20150514         | JP20150026500      | 20150213         |
| JP2015502728 T2    | 20150122         | JP20140540038T     | 20121031         |
| JP2016201548 A2    | 20161201         | JP20160119739      | 20160616         |
| JP5956596 B2       | 20160727         | JP20140540038T     | 20121031         |
| JP5966027 B2       | 20160810         | JP20150026500      | 20150213         |
| KR101602800 B1     | 20160311         | KR20147014579      | 20121031         |
| KR20140117354 A    | 20141007         | KR20147014579      | 20121031         |
| US2009183760 AA    | 20090723         | US20090357260      | 20090121         |
| US2009183763 AA    | 20090723         | US20090357268      | 20090121         |
| US2009183764 AA    | 20090723         | US20090357277      | 20090121         |
| US2009229666 AA    | 20090917         | US20080049159      | 20080314         |
| US2010131108 AA    | 20100527         | US20100684595      | 20100108         |
| US2010255630 AA    | 20101007         | US20100820560      | 20100622         |
| US2010258185 AA    | 20101014         | US20100820522      | 20100622         |
| US2010258542 AA    | 20101014         | US20100820489      | 20100622         |
| US2010258982 AA    | 20101014         | US20100820455      | 20100622         |
| US2010282293 AA    | 20101111         | US20100815913      | 20100615         |

|                 |          |               |          |
|-----------------|----------|---------------|----------|
| US2012234374 AA | 20120920 | US20120485210 | 20120531 |
| US2013062956 AA | 20130314 | US20120664885 | 20121031 |
| US2013312812 AA | 20131128 | US20130957227 | 20130801 |
| US2014035373 AA | 20140206 | US20130053482 | 20131014 |
| US2014174535 AA | 20140626 | US20140190966 | 20140226 |
| US2014360561 AA | 20141211 | US20140465392 | 20140821 |
| US2015047689 AA | 20150219 | US20140532305 | 20141104 |
| US2017085094 AA | 20170323 | US20160368237 | 20161202 |
| US8212139 BB    | 20120703 | US20100684595 | 20100108 |
| US8536054 BB    | 20130917 | US20100820455 | 20100622 |
| US8546172 BB    | 20131001 | US20100820489 | 20100622 |
| US8563847 BB    | 20131022 | US20100815913 | 20100615 |
| US8586398 BB    | 20131119 | US20100820560 | 20100622 |
| US8748727 BB    | 20140610 | US20090357268 | 20090121 |
| US8828778 BB    | 20140909 | US20120485210 | 20120531 |
| US8933320 BB    | 20150113 | US20090357260 | 20090121 |
| US9299861 BB    | 20160329 | US20120664885 | 20121031 |
| US9543890 BB    | 20170110 | US20130053482 | 20131014 |
| US9768725 BB    | 20170919 | US20140532305 | 20141104 |
| US9773933 BB    | 20170926 | US20130957227 | 20130801 |
| WO09092109 A1   | 20090723 | WO2009US31594 | 20090121 |
| WO09092110 A2   | 20090723 | WO2009US31596 | 20090121 |
| WO09092110 A3   | 20091029 | WO2009US31596 | 20090121 |
| WO09092111 A2   | 20090723 | WO2009US31597 | 20090121 |
| WO09092111 A3   | 20091119 | WO2009US31597 | 20090121 |
| WO09092111 A8   | 20100826 | WO2009US31597 | 20090121 |
| WO09114281 A2   | 20090917 | WO2009US35328 | 20090226 |
| WO09114281 A3   | 20091112 | WO2009US35328 | 20090226 |
| WO10148009 A2   | 20101223 | WO2010US38702 | 20100615 |
| WO10148009 A3   | 20110324 | WO2010US38702 | 20100615 |
| WO11084836 A2   | 20110714 | WO2010US61864 | 20101222 |
| WO11084836 A3   | 20111117 | WO2010US61864 | 20101222 |
| WO12021650 A2   | 20120216 | WO2011US47291 | 20110810 |
| WO12021650 A3   | 20120510 | WO2011US47291 | 20110810 |
| WO13066998 A1   | 20130510 | WO2012US62784 | 20121031 |
| WO14055454 A1   | 20140410 | WO2013US62747 | 20130930 |
| WO15027104 A1   | 20150226 | WO2014US52166 | 20140821 |

# Priority:

|                |          |                |          |                |          |
|----------------|----------|----------------|----------|----------------|----------|
| US20080022246P | 20080118 | US20080022228P | 20080118 | US20080022242P | 20080118 |
| US20080022234P | 20080118 | US20080022236P | 20080118 | US20080022245P | 20080118 |
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| US20080045229P | 20080415 | US20080058485P | 20080603 | US20080080628P | 20080714 |
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| US20090220035P | 20090624 | US20090248136P | 20091002 | US20090249778P | 20091008 |
| US20090249783P | 20091008 | US20100684595  | 20100108 | US20100711040  | 20100223 |
| US20100345446P | 20100517 | EP20100790069  | 20100615 | JP20120516209  | 20100615 |
| JP20120516209T | 20100615 | US20100815913  | 20100615 | WO2010US38702  | 20100615 |
| US20100820560  | 20100622 | US20100820522  | 20100622 | US20100820489  | 20100622 |
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| US20120664885  | 20121031 | US20120720606P | 20121031 | WO2012US62784  | 20121031 |
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| WO2013US62747  | 20130930 | US20130053482  | 20131014 | US20130890780P | 20131014 |
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| US20130900389P | 20131105 | US20130903511P | 20131113 | US20130921998P | 20131230 |
| US20140930894P | 20140123 | US20140190966  | 20140226 | US20140465392  | 20140821 |
| WO2014US52166  | 20140821 | US20140532305  | 20141104 | JP20160119739  | 20160616 |
| US20160368237  | 20161202 |                |          |                |          |

**Probable Assignee:** TENKSOLAR INC

**Assignee(s):** (std): BERG LOWELL J ; CORNEILLE JASON STEPHAN ; CORNEILLE JASON STEPHEN ; CROFT STEVEN THOMAS ; MEYER DALLS W ; MEYER DALLAS W ; MIASOLE ; MEYER FORREST C ; KNIGHT RAYMOND W ; MCCOLL WILLIAM JAMES ; DODD ORVILLE D ; MURNAN THOMAS L ; TENKSOLAR ; NOVOTNY JOHN P ; WHEELER STEVEN E ; TENKSOLAR INC ; WUDU MULUGETA ZERFU ; STOVER LANCE

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**Agent(s):** MAIKOWSKI AND NINNEMANN PATENTANWALTE PARTNERSCHAFT MBB; LAWRENCE RICHARD ANTHONY; GROSS FELIX; MUELLER WOLFRAM HUBERTUS; MAIKOWSKI AND NINNEMANN; MAIKOWSKI AND NINNEMANN PATENTANWALTE PARTNERSCHAFT MBB; ONDA MAKOTO; ONDA HIRONORI; WORKMAN NYDEGGER,1000 EAGLE GATE TOWER; WORKMAN NYDEGGER 1000 EAGLE GATE TOWER; WEAVER AUSTIN VILLENEUVE AND SAMPSON LLP; MASCHOFF GILMORE AND ISRAELSEN; MASCHOFF BRENNAN; ISRAELSEN BURNS R; ISRAELSEN R BURNS; AUSTIN JAMES E ET AL; ISRAELSEN BURNS R ET AL; ISRAELSEN R BURNS ET AL

**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

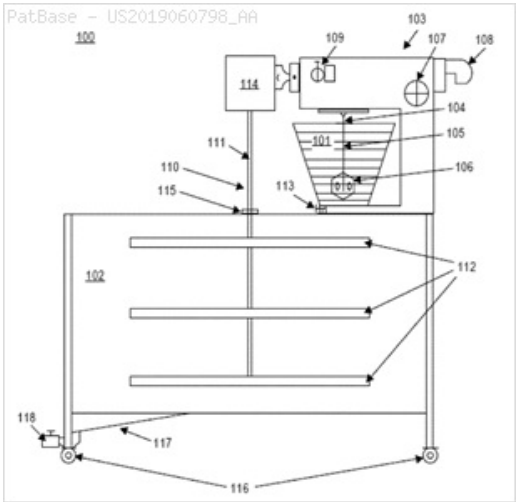
**17) Family number: 73342776 (US2019060798A)** © PatBase

**Title:** METHODS, DEVICES, AND SYSTEMS FOR PROCESSING AND FILTERING CARBONACEOUS COMPOSITIONS

**Abstract:** Provided herein are methods, devices, and systems for processing of carbonaceous compositions. The processing may include the manufacture (or synthesis) of oxidized forms of carbonaceous compositions and/or the manufacture (or synthesis) of reduced forms of oxidized carbonaceous compositions. Some embodiments provide methods, devices, and systems for the manufacture (or synthesis) of graphene oxide from graphite and/or for the manufacture (or synthesis) of reduced graphene oxide from graphene oxide. Some embodiments provide methods, devices, and systems for filtering graphene oxide, graphene, or reduced graphene oxide.

**Classifications:**

**International (IPC 8-9):** B01D29/00 B01D29/60 B01D29/90 C01B32/196 C01B32/198 C10G1/00 (Advanced/Invention)  
**CPC:** B01D29/009 B01D29/0072 B01D29/90 B01D2201/204 C01B32/198 C01B32/196 B01D29/60



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US2019060798 AA    | 20190228         | US20180116776      | 20180829         |
| WO19046462 A1      | 20190307         | WO2018US48602      | 20180829         |

**Priority:**

US20170552250P 20170830      US20180116776 20180829

**Probable Assignee:** NANOTECH ENERGY INC

**Assignee(s):** (std): NANOTECH ENERGY INC

**Inventor(s):** (std): LAINE SCOTT

**Agent(s):** BRESNAHAN MATTHEW J

**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 JO JP KE KG KH KM KN KP KR KW 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 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

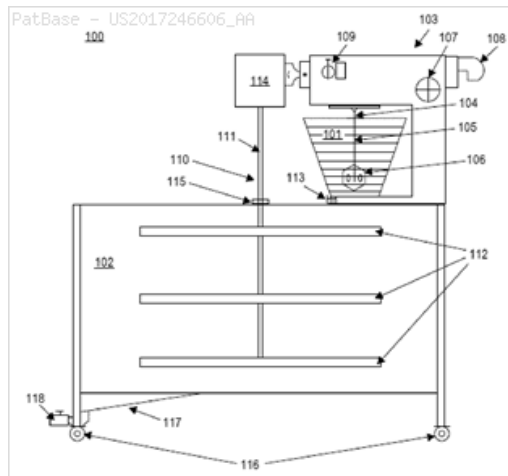
**18) Family number: 66771855 (US2017246606A)** © PatBase

**Title:** METHODS, DEVICES AND SYSTEMS FOR PROCESSING OF CARBONACEOUS COMPOSITIONS

**Abstract:** Provided herein are methods, devices and systems for processing of carbonaceous compositions. The processing may include the manufacture (or synthesis) of oxidized forms of carbonaceous compositions and/or the manufacture (or synthesis) of reduced forms of oxidized carbonaceous compositions. Some embodiments provide methods, devices and systems for the manufacture (or synthesis) of graphite oxide from graphite and/or for the manufacture (or synthesis) of reduced graphite oxide from graphite oxide.

**Classifications:**

**International (IPC 8-9):** B01J B01J19/18 B01J8/08 B01J8/10 B82Y30/00 C01B31/04 C01B32/00 C01B32/15 C01B32/196 C01B32/198 C01B32/20 C01B32/21 (Advanced/Invention); B01J (Subclass/Invention)  
**CPC:** B01J8/10 B01J8/082 B01J8/087 B01J2208/00141 B01J2208/00088 B01J2208/00761 B01J2208/00858 C01B32/198 C01B32/196 B01J2208/00752 B01J2208/00867  
**JP F-Term:** 4G146 4G146/AA01 4G146/AA02 4G146/AD17 4G146/BC19 4G146/CA08 4G146/CB01 4G146/CB09 4G146/CB10 4G146/CB11 4G146/CB13 4G146/CB14 4G146/CB19 4G146/CB26 4G146/CB31 4G146/CB32 4G146/CB37 4G146/DA07 4G146/DA21 4G146/DA22 4G146/DA41 4G146/DA42 4G146/DA47  
**JP F-Index:** C01B32/00 C01B32/198 C01B32/21

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AU2017222654 AA    | 20181004         | AU20170222654      | 20170224         |
| BR112018067939 A2  | 20190115         | BR20181167939      | 20170224         |
| CA3015503 AA       | 20180816         | CA20173015503      | 20170224         |
| CN109071234 A      | 20181221         | CN201780026016     | 20170224         |
| EP3419932 A1       | 20190102         | EP20170757331      | 20170224         |
| IL261228 A0        | 20181031         | IL20170261228      | 20170224         |
| IN201817036106 A   | 20190118         | IN201817036106     | 20180925         |
| JP2019507717 T2    | 20190322         | JP20180544273T     | 20170224         |
| KR20190002432 A    | 20190108         | KR20187027633      | 20170224         |
| TW201736258 A      | 20171016         | TW20170106573      | 20170224         |
| US2017246606 AA    | 20170831         | US20170442336      | 20170224         |
| US2017361294 AA    | 20171221         | US20170693222      | 20170831         |
| US2019009238 AA    | 20190110         | US20180130751      | 20180913         |
| US9782739 BB       | 20171010         | US20170442336      | 20170224         |
| US10112167 BB      | 20181030         | US20170693222      | 20170831         |
| WO17147468 A1      | 20170831         | WO2017US19423      | 20170224         |

**Priority:**

US20160300550P 20160226 US20160301511P 20160229 US20160302689P 20160302  
US20160324796P 20160419 US20170442336 20170224 WO2017US19423 20170224  
US20170693222 20170831 US20180130751 20180913

**Probable Assignee:** NANOTECH ENERGY INC

**Assignee(s):** (std): NANOTECH ENERGY INC

**Assignee(s):** LAINE SCOTT

**Inventor(s):** (std): LAINE SCOTT ; SCOTT LAINE

**Agent(s):** FB RICE PTY LTD; GOWLING WLG CANADA LLP; CAMPABADAL I MONFA GEMMA; WILSON SONSINI  
GOODRICH AND ROSATI; BRESNAHAN MATTHEW J

**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

**19) Family number: 49883915** (US2011266006A)

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**Title:** HYDRAULIC SURFACE CONNECTOR

**Abstract:** A connector to secure a blow out preventer to tubing or a casing head of a well or wellhead and a method of securing a blow out preventer to the well utilizing the connector. The connector may be configured to secure the blow out preventer adapter to the wellhead and provide, within fifteen minutes, a seal operable to withstand ten thousand pounds per square inch of pressure. The connector may include both a hydraulically operated locking segment and a separate mechanical locking segment, and wherein both locking segments may be transitioned from a fully retracted position to a fully locked position within fifteen minutes. The connector may be configured to accommodate up to ten degrees of misalignment between the blow out preventer and the tubing.

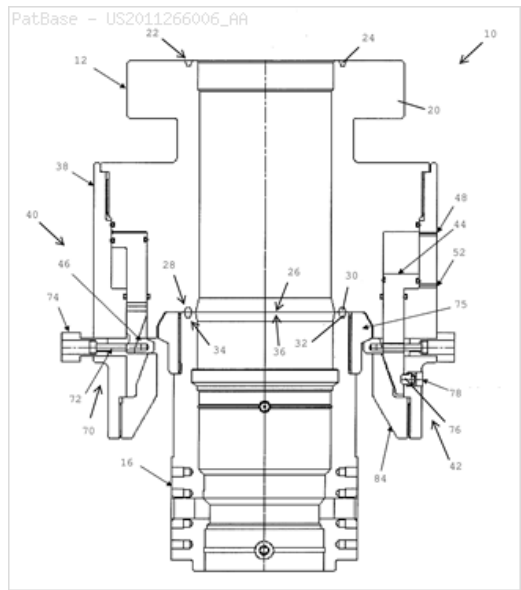
**Classifications:**

**International (IPC 8-9):** E21B17/02 E21B19/00 E21B19/16  
E21B33/06 (Advanced/Invention)

**CPC:** E21B33/038

**European:** E21B33/038

**US:** 166/345 166/379 166/97.5 285/305 285/305S 285/335 285/335S



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US2011266006 AA    | 20111103         | US20110098008      | 20110429         |
| US8567513 BB       | 20131029         | US20110098008      | 20110429         |

**Priority:**

US20100330231P 20100430      US20110098008 20110429

**Probable Assignee:** T 3 PROPERTY HOLDINGS INC

**Assignee(s):** (std): KAJARIA SAURABH ; LACHENY MICHAEL A ; SYED WASSEE ; T 3 PROPERTY HOLDINGS INC

**Inventor(s):** (std): KAJARIA SAURABH ; LACHENY MICHAEL A ; SYED WASSEE

**Agent(s):** LOCKE LORD LLP