

[SS 1] pump and (cleaning OR clean)

Results in EPODOC 61.415

[SS 2] 1 and system

Results in EPODOC 15.568

[SS 3] 2 and (stroke w1 lenght)

Results in EPODOC 0

EPODOC: term 'STROKE W1 LENGHT' not found in index 'BI'. WARNING(1)

[SS 4] 2 and (stroke w1 length)

Results in EPODOC 0

EPODOC: term 'STROKE W1 LENGTH' not found in index 'BI'. WARNING(1)

[SS 5] 2 and (stroke d1 lenght)

Results in EPODOC 0

EPODOC: term 'STROKE D1 LENGHT' not found in index 'BI'. WARNING(1)

[SS 6] 2 and stroke

Results in EPODOC 65

[SS 7] 6 and length

Results in EPODOC 6

[SS 8] ..li



- 1/6 © EPODOC / EPO
- PN

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[MX2016013205](#) A 20170126
- PR

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US201461990492P
20140508; US201514704079
20150505; WO2015US29510
20150506
- AP

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MX20160013205 20150506
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[E21B28/00](#) ; [E21B37/00](#) ;
[E21B43/127](#) ; [E21B47/0008](#)
- CUI

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[F04B1/128](#) ; [F04B47/00](#) ;
[F04B47/026](#) ; [F04B49/06](#) ;
[F04B49/12](#)
- CQI

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[E21B43/126](#)
- PA

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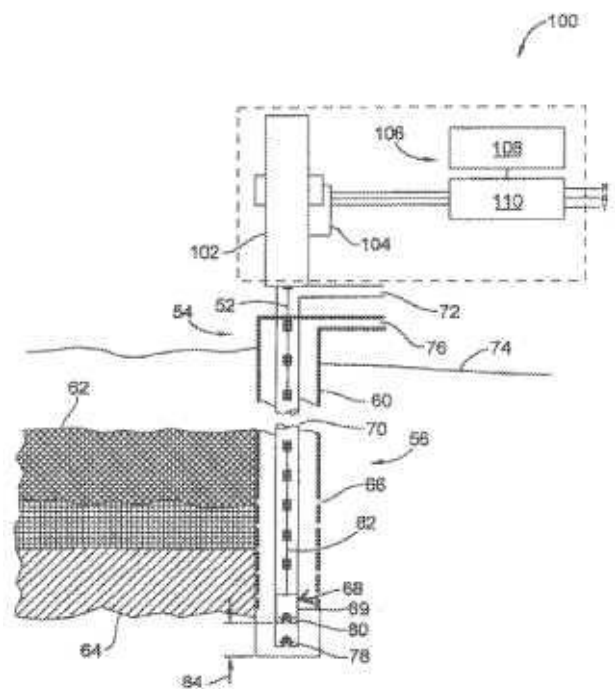
UNICO [US]
- TI

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SUBTERRANEANPUMP
WITH PUMP CLEANING MODE.
- AB

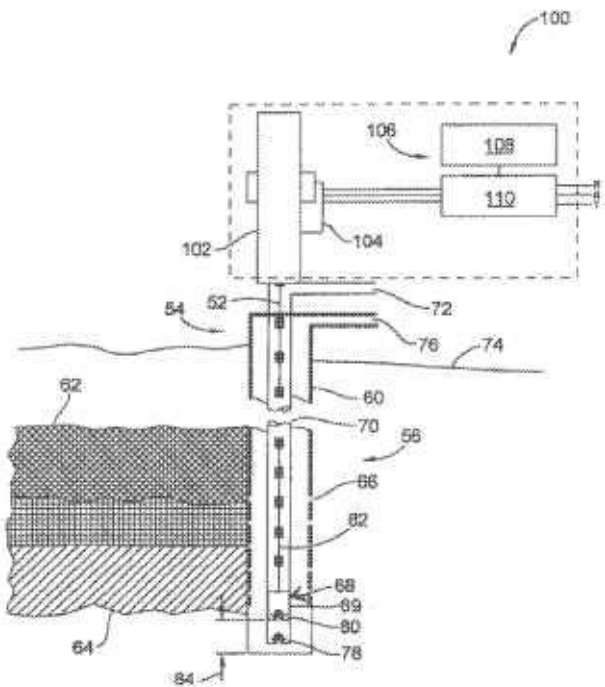
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A method to dislodge debris from
a pump system in which
the pump system includes a
down-hole pump coupled by a



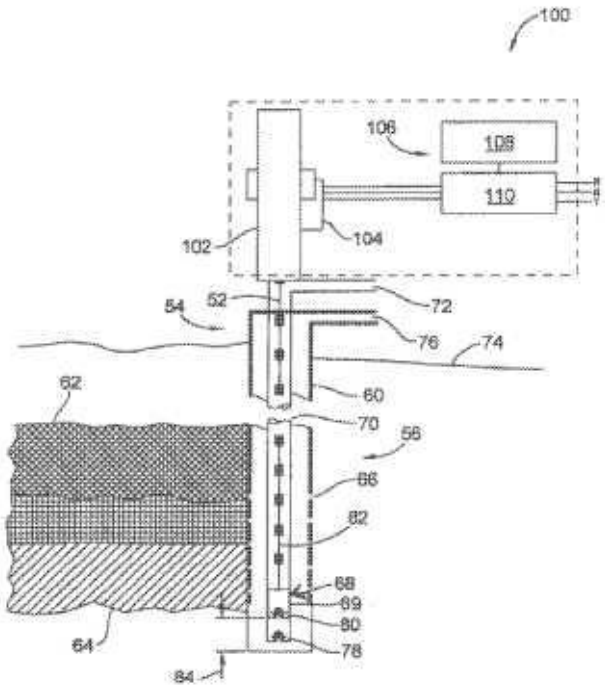
rod string to an above-ground **pump** actuator, which is coupled to a controller configured to operate the **pump system**, and where the actuator has an adjustable **stroke length**. The method also includes determining that the **pump system** should begin operating in a **pump clean** mode, implementing the **pump clean** mode configured in the controller, and cycling the **pump** actuator at a preset command speed using a preset starting **stroke length**, preset acceleration rate and a preset deceleration rate. The method also includes continuing to cycle the **pump** actuator while incrementally decreasing the **stroke length** by a preset **stroke length** increment resulting in increased **pump** cycling frequencies. Further, the method calls for determining that the **pump clean** mode is complete, and returning the **pump system** to a normal operation mode.

2/6	© EPODOC / EPO
PN	- CA2943898 A1 20151112
PR	- US201461990492P 20140508; US201514704079 20150505; WO2015US29510 20150506
AP	- CA20152943898 20150506
DT	- I
CCI	- E21B28/00 ; E21B37/00 ; E21B43/127 ; E21B47/0008
CUI	- F04B1/128 ; F04B47/00 ; F04B47/026 ; F04B49/06 ; F04B49/12
CQI	- E21B43/126
PA	- UNICO [US]
TI	- SUBTERRANEANPUMP WITH PUMP CLEANING MODE
AB	- A method to dislodge debris from a pump system in which the pump system includes a down-hole pump coupled by a rod string to an above-ground pump actuator, which is coupled to a controller configured to operate the pump system , and where the actuator has an adjustable stroke length .



The method also includes determining that the **pump system** should begin operating in a **pump clean** mode, implementing the **pump clean** mode configured in the controller, and cycling the **pump** actuator at a preset command speed using a preset starting **stroke length**, preset acceleration rate and a preset deceleration rate. The method also includes continuing to cycle the **pump** actuator while incrementally decreasing the **stroke length** by a preset **stroke length** increment resulting in increased **pump** cycling frequencies. Further, the method calls for determining that the **pump clean** mode is complete, and returning the **pump system** to a normal operation mode.

3/6	© EPODOC / EPO
PN	- AU2015256007 A1 20161013
PR	- US201461990492P 20140508; US201514704079 20150505; WO2015US29510 20150506
AP	- AU20150256007 20150506
DT	- I
CCI	- E21B28/00 ; E21B37/00 ; E21B43/127 ; E21B47/0008
CUI	- F04B1/128 ; F04B47/00 ; F04B47/026 ; F04B49/06 ; F04B49/12
CQI	- E21B43/126
PA	- UNICO
TI	- Subterranean pump with pump cleaning mode
AB	- A method to dislodge debris from a pump system in which the pump system includes a down-hole pump coupled by a rod string to an above-ground pump actuator, which is coupled to a controller configured to operate the pump system , and where the actuator has an adjustable stroke length . The method also includes determining that the pump system should begin operating in a pump clean mode, implementing the pump clean mode configured in the



controller, and cycling the **pump** actuator at a preset command speed using a preset starting **stroke length**, preset acceleration rate and a preset deceleration rate. The method also includes continuing to cycle the **pump** actuator while incrementally decreasing the **stroke length** by a preset **stroke length** increment resulting in increased **pump** cycling frequencies. Further, the method calls for determining that the **pump clean** mode is complete, and returning the **pump system** to a normal operation mode.

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PN	- WO2015171797 A1 20151112
PR	- US201461990492P 20140508; US201514704079 20150505
AP	- WO2015US29510 20150506
DT	- **
CT	- KR ISR (A1) US2011232283 A1 20110929 [A] (GREGORY BENJAMIN J [US], et al) [A] 1-15 * See paragraphs [0032]-[0036] and figure 1. *; US4691511 A 19870908 [A] (DOLLISON WILLIAM W [US]) [A] 1-15 * See abstract, column 3, line 66 - column 5, line 2, column 12, lines 47-59, and figure 9. *; US8360756 B2 20130129 [A] (FORD MICHAEL BRENT [US]) [A] 1-15 * See abstract, column 1, line 18 - column 2, line 34, and figures 1, 22, 23. *; US7713035 B2 20100511 [A] (FORD MICHAEL BRANT [US]) [A] 1-15 * See abstract, column 4, line 48 - column 5, line 10, and figures 1, 2, 9. *; JP2014051918 A 20140320 [A] (TOYOTA MOTOR CORP) [A] 1-15 * See paragraphs [0016]-[0022] and figure 4. *
CCI	- E21B28/00 ; E21B37/00 ; E21B43/127 ; E21B47/0008
CUI	- F04B1/128 ; F04B47/00 ; F04B47/026 ; F04B49/06 ; F04B49/12
CQI	- E21B43/126
PA	- UNICO [US]; PETERSON RONALD G [US]; BENDER JONATHAN D [US]
TI	- SUBTERRANEANPUMP WITH PUMP CLEANING MODE
AB	- A method to dislodge debris from a pump system in which the pump system includes a down-hole pump coupled by a rod string to an above-ground pump actuator, which is coupled to a controller configured to operate the pump system , and where the actuator has an adjustable stroke length . The method also includes determining that the pump system should begin operating in a pump clean mode, implementing the pump clean mode configured in the controller, and cycling the pump actuator at a preset command speed using a preset starting stroke length , preset acceleration rate and a preset deceleration rate. The method also includes continuing to cycle the pump actuator while incrementally decreasing the stroke length by a preset stroke length increment resulting in increased pump cycling frequencies. Further, the method calls for determining that the pump clean mode is complete, and returning the pump system to a

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PN - [US2015322755](#) A1 20151112

PNFP - US9689251 B2 20170627

PR - US201514704079
20150505; US201461990492P
20140508

AP - US201514704079 20150505

DT - *; Rep

CT - || R141 (A1)
[US4098340](#) A 19780704 [
] (STEELE BARNEY RAYMOND, et
al);
[US2014294603](#) A1 20141002 [
] (BEST LARRY D [US]);
[US2012177504](#) A1 20120712 [
] (BECK THOMAS L [US], et al)

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[US4098340](#) A 19780704 [
] (STEELE BARNEY RAYMOND, et
al);
[US2012177504](#) A1 20120712 [
] (BECK THOMAS L [US], et al);
[US2014294603](#) A1 20141002 [
] (BEST LARRY D [US])

CCI - [E21B28/00](#) ; [E21B37/00](#) ;
[E21B43/127](#) ; [E21B47/0008](#)

CUI - [F04B1/128](#) ; [F04B47/00](#) ;
[F04B47/026](#) ; [F04B49/06](#) ;
[F04B49/12](#)

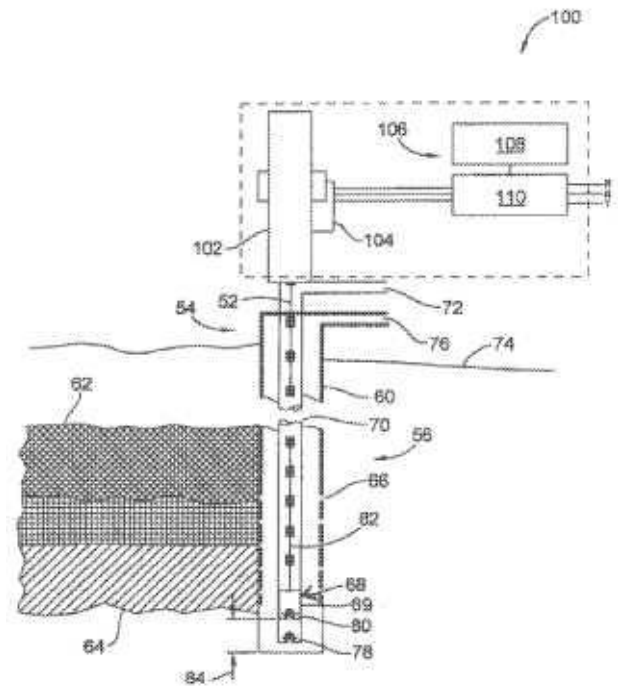
CQI - [E21B43/126](#)

PA - (A1 B2)
PETERSON RONALD G [US];
BENDER JONATHAN D [US]; UNICO
[US]

TI - (A1)
SUBTERRANEANPUMP
WITH **PUMP CLEANING** MODE

- (B2)
Subterranean **pump** with **pump**
cleaning mode

AB - (A1 B2)
A method to dislodge debris from
a **pump system** in which
the **pump system** includes a
down-hole **pump** coupled by a
rod string to an above-
ground **pump** actuator, which is
coupled to a controller
configured to operate the **pump**
system, and where the actuator
has an adjustable **stroke length**.
The method also includes
determining that the **pump**
system should begin operating
in a **pump clean** mode,



implementing the **pump clean** mode configured in the controller, and cycling the **pump** actuator at a preset command speed using a preset starting **stroke length**, preset acceleration rate and a preset deceleration rate. The method also includes continuing to cycle the **pump** actuator while incrementally decreasing the **stroke length** by a preset **stroke length** increment resulting in increased **pump** cycling frequencies. Further, the method calls for determining that the **pump clean** mode is complete, and returning the **pump system** to a normal operation mode.

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PN - [GB632602](#) A 19491128

PR - USX632602 19441017

AP - GB19470017845 19470707

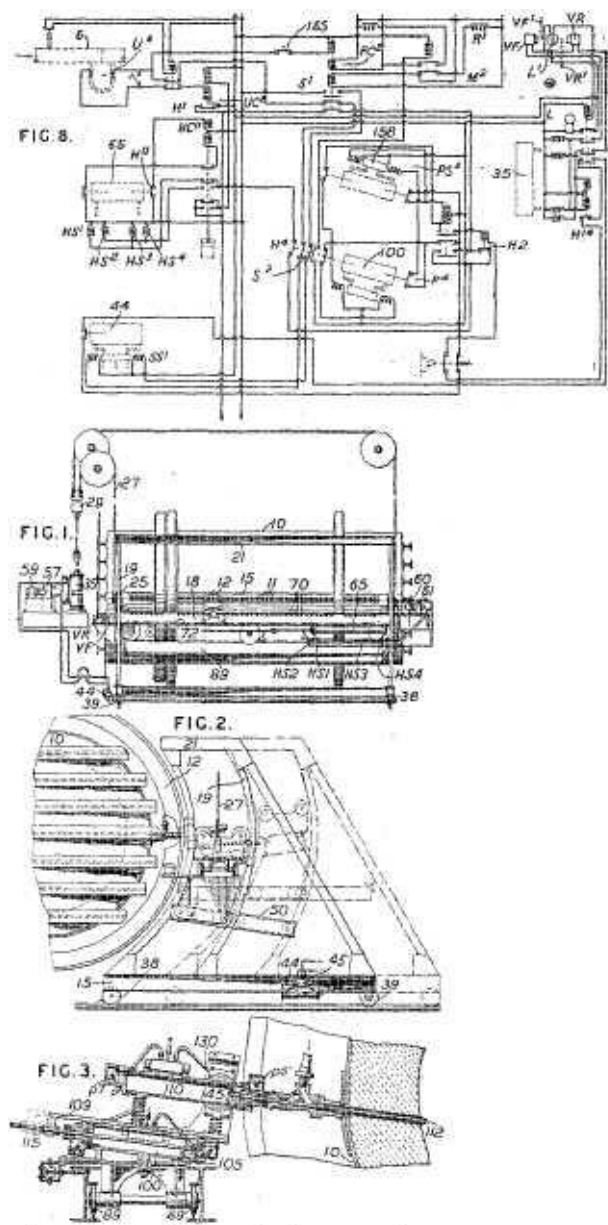
DT - *

CCI - [C21C5/48](#)

PA - AMERICAN SMELTING REFINING

TI - Improvements in or relating to apparatus for punching converter tuyeres

AB - 632,602. **Cleaning** blast tuyeres. AMERICAN SMELTING & REFINING CO. July 7, 1947, No. 17845. Convention date, Oct. 17, 1944. [Class 72] '[Also in Group XXVIII] Apparatus for punching the tuyeres of a converter 10 such as those used in copper smelting comprises a frame 21, Figs. 1 and 2, movable to and from the converter and provided with one or more carriages 15 punching mechanisms 12 on which may be automatically moved to position the punch or punches in successive alignment with individual tuyeres 11 while the punches are reciprocated to clear away encrustations. In one form having a single punching mechanism, the converter has a longitudinal row of tuyeres 11 and the punching carriage moves on rollers 89 along a bed 18 movably supported by rollers 25 within spaced arcuate guides 19 secured to the frame 21. The bed



is partly counterbalanced by a weight 29 on a cable **system** 27 and may be moved vertically by a hydraulic cylinder 35 supplied by a **pump** 57 driven by a motor 59. The frame 21 conveying the entire punching assembly is supported on wheels 38, 39 and may be moved by a hydraulic cylinder 44 with a solenoid-controlled valve 45 to withdraw the frame to the dotted position in Fig. 2. When the frame is withdrawn, a manual punching platform 50 may be extended and adjusted for height by the cylinder 35 so that in cases of breakdown manual punching may be employed. The puncher carriage is moved longitudinally by a cylinder 65 supplied by a **pump** 60 driven by motor 61. The carriage is located opposite the tuyeres by means of a number of adjustable cams 70 which operate electric contacts to stop the carriage opposite each tuyere. The carriage is secured to a cable 72 passing over a **system** of sheaves operated by the cylinder 65 which is controlled by a number of solenoid-actuated valves HS1-HS4. Mounted on the carriage is a secondary punching cylinder 100, Fig. 3, operated by compressed air, the piston being adapted to operate electric switches at the ends of its strokes. This cylinder actuates the slide 109 carrying the primary pneumatic punching cylinders 110 which reciprocate the punch rod 112 adjustment being provided at 115 to determine the limits of the punch travel. The cylinder 110 has its forward end mounted in a spherical bearing 130 which is mounted on radial springs which yield to permit operation on misaligned tuyeres. Limit switches P5, P7 are operated by the piston 145 at the ends of its **stroke**. The electrical control **system**, Fig. 8, provides interlocks to ensure the proper sequence of operations. When normal air flow through conduit 6 to the tuyeres decreases to a

predetermined value contacts U2 are closed and this through coil UC2 closes switch H1 starting motor 61 and operating the piston of cylinder 65. This motion is interrupted at each tuyere while the punch operates. Thus when the punch reaches a tuyere and engages cam 70 switch H2 is opened to cause closing of valves HS1-HS4 and stopping of the plunger. At the end of the longitudinal travel a switch H11 is closed and energizes coil HC11 and causes reverse longitudinal movement of the punch carriage. At a punching position where cam 70 is engaged movement of the frame 21, turning of the converter, and longitudinal movement of the punch carriage are all prevented. The piston 105 of the lower cylinder 100 first completes its **stroke** and closes contact P4 which energizes coil PS2, actuates control valve 158 and moves the piston 145 to the right, Fig. 3, for the punching **stroke** at the end of which the piston 145 and then the piston 105 are returned. Completion of the latter movement closes contacts H4 and starts longitudinal movement of the punch carriage to the next tuyere, movement being arrested by the next cam 70. The automatic sequence provides for clearing all the tuyeres once along the **length** of the converter. Means are also provided to move aside the punch mechanism by shifting the frame 21. For this purpose a turn-over controller is actuated to energize coil FC2, Fig. 8, which through switches S1, S2 energizes coil SS1 causing cylinder 44 to withdraw the frame 21. A further switch M2 is closed to cause turning of the converter. When this has been effected the coil FC2 is deenergized and a coil R1 energized to turn the converter back into normal position after which the puncher frame 21 is returned to operative position. The frame 21 may also be

withdrawn when necessary by closing a manual switch 165, Fig. 8. For vertically aligning the puncher with the tuyeres an electric eye VR or VF, Figs. 1 and 8, has its light source L1 intercepted by either of two plates VRI or VFI which holds coil H14 open until the punch is in proper alignment. According to which of the interceptor plates interrupts the light beam one or other set of valves controlling the vertical motion cylinder 35 is actuated to move the bed 18 in the required direction until the interceptor plate is cleared, at which point the punch carriage is properly positioned. An alarm is sounded if the light source L1 fails and the punch remains inoperative until the source is restored. In a modification, three punching mechanisms are provided and one or two hydraulic spacing links may serve for punching tuyeres with unequal spacing, such as those adjacent the riding rings. A modified circuit diagram for this manner of operation is also described. In some cases the punch rod may be heated to prevent the adherence of metal thereto during operation.