SUBMERGED WELL

Testing
For leak
Connection or disconnection of submerged members remotely controlled
With provision for removal or repositioning of member without removal of other well structure
Disconnection
With orienting or aligning of member for connection
Including removable, member mounted guide
Including means to pull member into position
Connection to provide fluid flow path
Connection of riser-and-tubing assembly to other structure
Yieldable tubing
Connection of lateral flow line
Connection of pipe hanging
Connection of guide means
Submerged, buoyant wellhead or riser
Means removably connected to permanent well structure
Surface vessel
Having means to move vessel to precise location
Having means to hold vessel at given location (e.g., anchor, etc.)
With means to compensate for vessel movement
Means to provide protective environment for operative access below surface of water
Separator
Drilling means
Removable riser
Well component assembly means
Pipe cutting means
With safety or emergency shutoff
Including disaster feature
With provision for disassembly
Multiple wells
Riser
Wellhead

SPECIFIC PATTERNS OF PLURAL WELLS

Using microorganisms
Nuclear energy or radioactivity for treating
Electric current or electrical wave energy through earth for treating
Vibrating the earth or material in or being placed in the earth pores

SURFACE MEANS

With indicating, testing, measuring or locating
Including in situ combustion
Including production of earth fluid by driving fluid
Residual oil or oil saturation
Salinity or acidity
Flood front
Permeability or viscosity
And tracing material
Indicating the location, presence, or absence of cement
Determining position of earth zone or marker
Well logging
Determining position of object in well
Tool orienting
Using whipstock
Permeability determining
Determining fluid interface or fluid level
Plug indicating or releasing
Scale or corrosion determination
Steam quality
Bottom hole pressure
Leak testing or locating
Impression means
Fracturing characteristic
Holder for coupon or sensor
Tracer
Determining stuck point
Of cementing or plugging technique
Automatic control for production
Prospecting
Including testing or treating tool having at least one actutable packer
In situ combustion
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CLASS 166 WELLS

257 ..Injecting while producing by in situ combustion from same well
258 ..Plural distinct superimposed formations
259 ..Including fracturing or attacking formation
260 ..Injecting specific fuel or catalyst for burning into formation
261 ..Injecting specific material other than oxygen into formation
262 ..Solid fuel or particles in well
264 ..Sampling well fluid
265 ..Separating material entering well
266 ..Injection and producing wells
267 ..Separating outside of well
268 ..Distinct, separate injection and producing wells
270 ..Injecting a composition to adjust the permeability (e.g., selective plugging)
270.1 ..Injecting a composition including a surfactant or cosurfactant
270.2 ..Nonaqueous type
400 ..Sequentially injected separate fluids (e.g., slugs)
401 ..Injecting a gas or gas mixture
402 ....CO2 or carbonated gas
403 .....In combination with additional organic material (e.g., alkyls, carbon chains)
272.1 ..Involving the step of heating
272.2 ....In association with fracturing or crevice forming processes
272.3 ....Steam as drive fluid
272.4 ....In combination with alkyls or carbon chains
272.5 ....With override zone, diverting, or path blocking operation
272.6 ....Liquid material injected
272.7 ....Horizontal well
271 ..Including fracturing or attacking formation
269 ..Fluid injected from longitudinally spaced locations in injection well
275 ..Injected fluid comprises water and material other than inorganic gas
263 ..Cyclic injection then production of a single well
276 ..Providing porous mass of adhered filter material in well
277 ..Repairing object in well
278 ..Graveling or filter forming
279 ..Material placed in pores of formation to treat resident fluid flowing into well
280.1 ..Specific propping feature (EPO)
280.2 ..Composition of proppant (EPO)
281 ..Separate steps of (1) cementing, plugging or consolidating and (2) fracturing or attacking formation
282 ..Specific low fluid loss feature for fluid attacking formation
283 ..Specific low fluid loss feature for fracturing fluid or cement causes fracture
284 ..Fluid flow causes pellet to block opening in wall of conduit
285 ..Cementing, plugging or consolidating
286 ..Tamping, vibrating, exploding or using receptacle
287 ..Removable molding or forming means
288 ..Including heating
289 ..Discharging cement from casing at different levels
290 ..By tubing which is subsequently lifted
291 ..With piston separator
292 ..Using specific materials
293 ....Cement or consolidating material contains inorganic water settable and organic ingredients
294 ....Cement or consolidating material is organic or has organic ingredient
295 ....Organic material is resin or resinous
296 ..Preventing flow into strainer while lowering by blocking openings
297 ..Perforating, weakening, bending or separating pipe at an unprepared point
298 ..Perforating, weakening or separating by mechanical means or abrasive fluid

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299 .With explosion or breaking
container to implode
300 .Chemical inter-reaction of two
or more introduced materials
(e.g., selective plugging or
surfactant)
301 .Freeing stuck object, grappling
or fishing in well
302 .Heating, cooling or insulating
303 ..Placing preheated fluid into
formation
304 .Dissolving or preventing
formation of solid oil deposit
305.1 .Placing fluid into the formation
306 ..Fluid enters and leaves well at
spaced zones
307 ..Attacking formation
308.1 ..Fracturing (EPO)
308.2 ...Using a chemical (EPO)
308.3 ....Water based composition with
inorganic material (EPO)
308.4 ....Oil based composition (EPO)
308.5 ....Including cross-linking agent
(EPO)
308.6 ....Foam (EPO)
309 .Producing foam or gas in well by
foaming or gas producing
material
310 .Entraining or incorporating
treating material in flowing
earth fluid
311 .Cleaning or unloading well
312 ..Liquid introduced from well top
313 ..Parallel string or multiple
completion well
369 .Producing the well
370 ..Including varying downhole
pressure
371 ..Including non-expulsive
material placed in well
372 ..By fluid lift
373 .Operating valve, closure, or
changeable restrictor in a
well
374 ..Operated by fluid pressure
controlled above ground
375 ...By auxiliary fluid control
line
376 .Destroying or dissolving well
part
377 .Disassembling well part
378 .Assembling well part
379 ..Above ground parts
380 ..Conduit
381 .Placing or shifting well part
382 ..Providing support for well part
(e.g., hanger or anchor)
383 ..By fluid driven piston
384 ..With bending of tubing
385 ..Flexible cable or wire
386 ..Fluid flow control member
(e.g., plug or valve)
387 ..With sealing feature (e.g.,
packer)

WELLS WITH LATERAL CONDUITS
MEANS FOR FORMING FILTER BEDS
(E.G., GRAVEL PLACING)

PLURAL WELLS

AUTOMATIC

.Float controlled valve

WITH MEANS FOR SEPARATELY PUMPING
FROM PLURAL SOURCES IN WELL

MEANS FOR CUTTING CABLE OR ROPE
BELLOW GROUND

.Cutting means actuated by
contacting element suspended
in well by cable or rope

MEANS FOR PERFORATING, WEAKENING,
BENDING OR SEPARATING PIPE AT
AN UNPREPARED POINT

55.1 .With disparate below ground
feature
55.2 .Perforating or splitting cutter
55.3 ..Wedge or cam actuated
55.6 .Cutter rotates circumferentially
of pipe
55.7 ..Internal
55.8 ...Tool moved radially by fluid
pressure

SCREEN AND OUTSIDE CLEANING PIPE
WITH HEATING, REFRIGERATING OR
HEAT INSULATING MEANS

59 .Fuel supply or hot billet in
well
60 .Burner in well
61 .Electrical heater in well
62 .With eduction pump or plunger in
well

WITH EXPLOSIVE OR GAS GENERATING
MEANS IN WELL

WITH TIME OR DISTANCE MEASURING,
TEMPERATURE RESPONSIVE OR
COUNTING MEANS

WITH ELECTRICAL MEANS

.Indicating
66.4 .Electrical motor (e.g., solenoid
actuator)
66.5 .Magnetic

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66.6 . Valve
66.7 . Longitudinally movable operator
67 WITH BELOW AND ABOVE GROUND MODIFICATION
68 . Eduction pump or plunger in well
68.5 . With above ground (1) motor carried by casing or casing support or (2) well fluid pump
69 . With receptacle for insertion into well
70 . Head for tool, piston or cleaner (e.g., cement head)
71 . With above ground casing sinking means
72 . Above ground actuating means for below ground device
73 . Tubing or casing actuated
74 . With below ground screen
75.11 ABOVE GROUND APPARATUS
76.1 . Having structure for converting from one mode of operation to another; e.g., valve to packer
77.1 . Moving tubing or cable into an existing well
77.2 . Coiled tubing
77.3 . Chain injector
77.4 . Piston and cylinder
77.51 . With means facilitating connecting or disconnecting supported tubing or rod sections
77.52 . With elevator detail
77.53 . Upper and lower slips
85.1 . With assembly or disassembly means (e.g., handling, guiding or tool feature)
85.2 . Pitless well adapters
85.3 . Seal or bushing insertion or removal
85.4 . With blowout preventer
85.5 . Guiding or aligning feature
86.1 . Inner member anchor or seal with valve
86.2 . Annular sealing type valve
86.3 . Gate type (perpendicular to pipe) valve
87.1 . Axially movable type valve
88.1 . Inner member anchor or seal with lateral port
89.1 . Plural inner pipes
89.2 . Parallel pipes (as opposed to concentric)
89.3 . Having slip type hanger
88.2 . Slip type well anchor
88.3 . Seal actuated with anchor
88.4 . With hydraulic conduit or line extending through outer member
78.1 . With tube rotating means (rotary tables)
79.1 . Cap having transporting means or ground support
80.1 . Having retractable pipe section to allow closing of gate type valve or flapper valve for rod or pipe
81.1 . Fluid catcher around pipe coupling
82.1 . Releasable seal or cleaner disengaged by projection on inner member
83.1 . Latches releasable radially inward
84.1 . With seal for reciprocating member
84.2 . Cooling fluid or grease supplied to seals
84.3 . Rotary blowout preventer type
84.4 . Fluid pressure actuated seals
84.5 . Seal fixedly mounted to rod
90.1 . With means for inserting fluid into well
75.15 . With means for injecting solid or particulate material into the well
91.1 . With flow restrictions (e.g., chokes or beans)
92.1 . Cap or head pivotably attached to tube or casing
93.1 . Split cap or head
94.1 . Laterally adjustable cap or head
95.1 . Central valve or closure and lateral port
96.1 . External anchoring or bracing means
97.1 . With valve on cap or head
97.13 . Well caps or casing heads
97.14 . Suspension means
97.12 . Treatment of produced fluids
97.5 . Parallel pipes extending along distinct paths through wellhead

GRAPPLE AND WELL ANCHORED LIFTING MEANS
WITH JUNK RETRIEVING MEANS
LATERAL PROBE OR PORT SEALED AGAINST WELL WALL
PACKER OR PLUG AND PUMP OR PLUNGER MEANS EXERTING OUTWARD PRESSURE
CONVERTIBLE
WITH MOTOR FOR ROTARY OR OSCILLATING MOTION

WITH EDUCTION PUMP OR PLUNGER
105.1 Having sediment trap or deflector
105.2 Carried by reciprocating plunger or plunger rod
105.3 Sediment trap formed in pumping chamber
105.4 In pump discharge flow path
105.5 Having liquid-gas separator
105.6 Gas fed to entrainment type pump

WITH PACKER OR PLUG
106 With packer or plug
107 Receptacles
108 Piston actuates foot valve
109 Telescoping
110 Lateral port always below piston and used in well
111 Bail engaging piston rod
112 With leak means

COMBINED (E.G., WITH NON-ELECTRICAL INDICATING)

CENTRAL MEMBER WITH PRE-SET PACKER OR PLUG IN SAME CONDUIT

CENTRAL CHAMBER SEALED WITH RESPECT TO PREPOSITIONED MODIFIED SURROUNDING CONDUIT
116 Surrounding conduit carries packer or plug
117 RECEPTACLE OR PART THEREOF LEFT IN WELL
117.5 MEANS FOR GUIDING INSERTABLE ELEMENT LATERALLY OF WELL AXIS (E.G., WHIPISTOCK)
117.6 Secured in operative position by movable means engaging well conduit (e.g., anchor)

MEANS ANCHORED AGAINST ROTATION IN ONE CONDUIT SECTION FOR RELATIVELY ROTATING ANOTHER SECTION

PACKERS OR PLUGS
119 With expanding anchor
120 Anchor actuated by fluid pressure
121 Pressure transmitted by cup type packer or plug seal
122 Pressure transmitted by packer or plug expanded by confined fluid from central chamber, pump, or plunger
123 With detachable setting means
124 Screw threaded
125 Radially movable latch
126 With controllable passage between central chamber and space below packer
127 Spaced packer or plug seals
128 Passage controllable by movement of central chamber
129 With controllable bypass outside central conduit
130 Packer expanded by upper valve
131 With controllable passage between central conduit and space above packer or plug
132 Portion extends beyond end of surrounding conduit
133 With controllable passage through packer
134 Support and holddown expanding anchors
135 Flow stopping type, e.g., plug
136 Spring set anchor
137 Spring moves anchor slip relative to wedge or cam
138 Wedge or cam and friction drag
139 Threaded element rotated
140 Anchor above packer or plug seal
141 Sealing portion closes port between central pipe and outside space when unexpanded
142 With controllable passage between central chamber and space below packer
143 Central conduit detachable
144 Bottom supported casing or screen section
145 Bypass closing and passage opening to upward flow constrained to occur simultaneously
146 Passage connects with space below packers and continuously open passageway connects with space between packers
147 Passage connects with space between packer or plug seals
148 Upwardly biased check valve and means for opening or bypassing it
149 With passageway between central chamber and space above packer
150 Passageway controllable by movement of central chamber
...Passageway valve directly responsive to fluid pressure
Movement controllable by movement of central chamber
Adjustable over pipe or set over prepositioned pipe
With detachable setting means
...Packer or plug locked expanded
...With controllable bypass outside central conduit
...With controllable passage between central conduit and space above packer or plug
...With central conduit and fluid port to space outside
...Port between sealing portions and bypass around
...Expanded by confined fluid from central chamber, pump or plunger
...Controllable passage through packer
...For non-concentric members
...Spaced sealing portions
...Flow stopping type; e.g., plug
...Free falling type (e.g., dropped ball)
...With sleeve valve
...Deformable portion engages conduit restriction
...Central support has shoulders expanding sealing portion, or telescopes
...Cup type
...Non-deformable type
PISTONS, FLUID DRIVEN INTO WELL (E.G., CEMENTING PLUGS)
...Surrounding conduit valve or closure opened by piston
...With downflow past piston
...With stop
SCREEN WITH WASHING POINT OR SHOE
...Detachable wash pipe
RECEPTACLES
...With separate air chamber having openable passage
...With destroyable closure and valve
...With valved or closed top
...Valve control means contacting well conduit wall
...Bottom receiving and side discharge valves
...Readily releasable bottom valve
...Lateral ports used in well

BRUSHING, SCRAPING, CUTTING OR PUNCHING-TYPE CLEANERS
...Perforation cleaners
...Bow spring type
...On tubing or casing
...Retractable on support while lowering
...Reciprocable relative to central member extending from well top
...On sucker rod
SONIC DEVICE
CEMENTING DEVICE
HYDRAULIC FRACTURING DEVICE
VIBRATOR
AGITATOR
WITH JAR MEANS FOR RELEASING STUCK PART
SCREEN WITH VALVE, CLOSURE, CHANGEABLE RESTRICTOR OR PORTION REMOVABLE IN WELL
EXPANSIBLE ANCHOR OR CASING
...Expansible casing
...Liner hanger
...Set by wedge or cam at any point by drop only (e.g., tubing catcher)
...With friction drag for setting by turning movement also
...With spring
...Fluid pressure actuated
...Bowed anchor means
...Spring set
...Spring moves anchor slip relative to wedge or cam
...With wedge or cam and friction drag
...Expansible means translated by wedge or cam
WHIRLING OR LATERAL DISCHARGE OR PROJECTABLE NOZZLES
...Rotary or projectable
VALVES, CLOSURES OR CHANGEABLE RESTRICTORS
...Destructible element
...Operated by dropped element
...Fluid operated
...Variably opened
...Fluid pressure biased to open position position
...Retrievable
...Locked open or closed

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...With fluid pressure equalizing means
..One way, e.g., check valve type
...Flexible valve element
...Shoes with check valve
...Loose ball closure
...Loose ball closure with limited reverse flow
..Rotated operator
..Lug in branched slot, e.g., "J" slot
..Longitudinally movable operator
...Having rotational movement
...Ball valve type
...Operated by means inserted from the surface
...Valving means inserted or retrieved to operate
...Having a dump or discharge type means
...Having equalizing valve
..Flapper type
..Contact with bore bottom
...Vertical movement of conduit
...And rotational movement; e.g., ball valve-type
...Drain-type
...Fluid flow through lateral port to exterior

SCREENS
..Porous material
..Inserted screen plug
..Woven mesh
..Spiral
...With spacing lug for adjacent turns
...With perforated pipe
..Strip or rod
..Stacked annular sections
..Concentric pipes

DETENTS OR CLUTCHES
..Flow permitting means bridging fluid conduit
..Operated by dropped weight
..Lug in closed branched slot

GUIDE FOR DEVICE OR CONDUIT
..On sucker or pump rod
..Rotatable or having a rotatable element
...Surrounding existing rod
...For a wireline operation
...Surrounding existing device or tubing

CONDUIT WALL OR SPECIFIC CONDUIT END STRUCTURE
..Flexible tube or cable
..Plural, parallel, nonconcentric conduits
..Corrosion prevention or deterring
..Side entry
..Downhole coupling or connector
..Telescopic
..Shoe detail
..Brick or cement casing liner

MISCELLANEOUS (E.G., ANCHOR PIPES)

CROSS-REFERENCE ART COLLECTIONS

WELLS IN FROZEN TERRAIN
FOR INHIBITING CORROSION OR COATING

FOREIGN ART COLLECTIONS

FOR 000 CLASS-RELATED FOREIGN DOCUMENTS

Any foreign patents or nonpatent literature from subclasses that have been reclassified have been transferred directly to the FOR Collection listed below. These collections contain ONLY foreign patents or nonpatent literature. The parenthetical references in the collection titles refer to the abolished subclasses from which these COLLECTIONS were derived.

PROCESSES (166/244.1)
FOR 100 .Specific propping feature for a fracture (166/280)
FOR 101 ..Fracturing (166/308)