

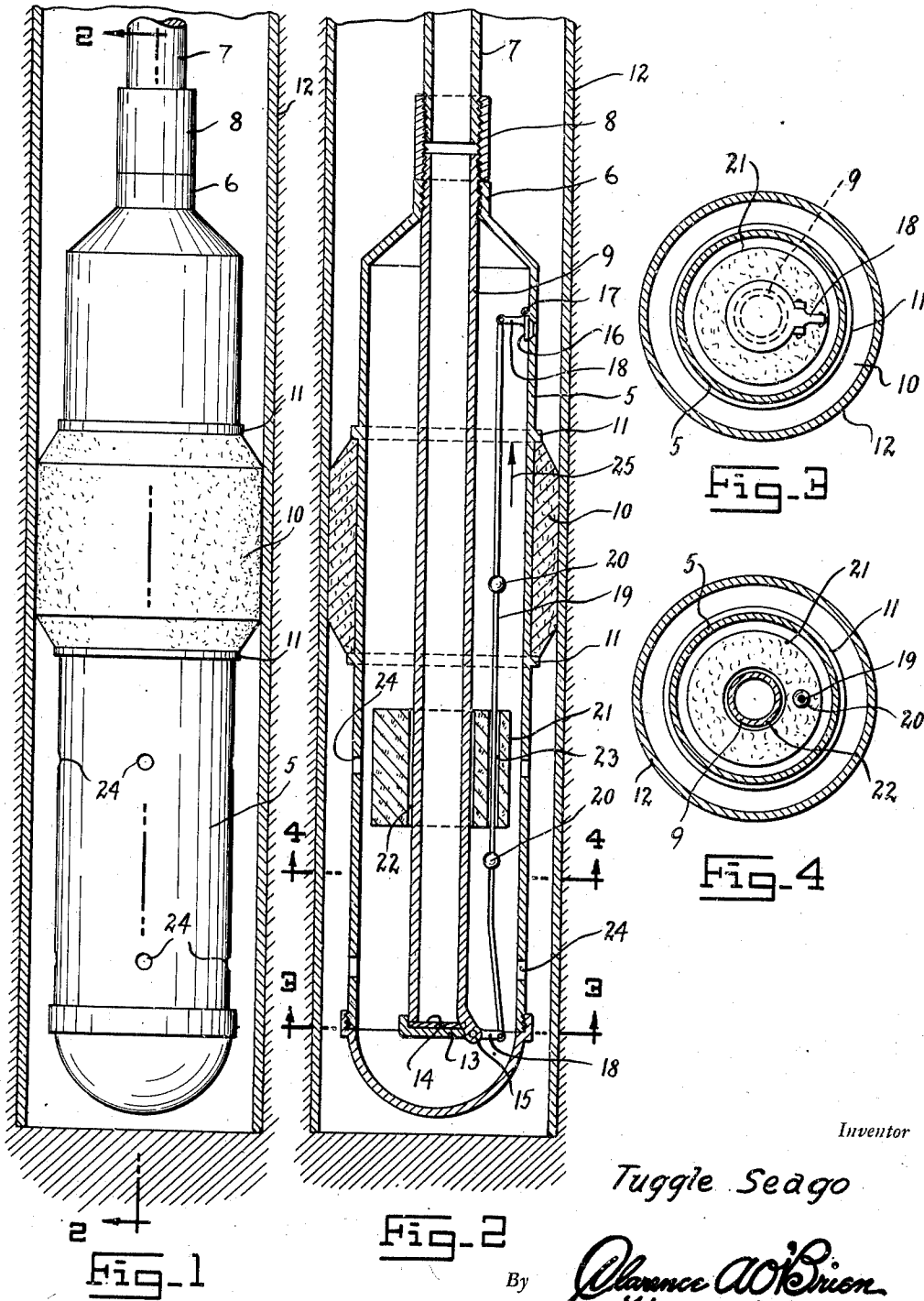
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GAS LIQUID SEPARATING DEVICE

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GAS LIQUID SEPARATING DEVICE

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This invention relates to new and useful improvements and structural refinements in gas liquid separating devices, more specifically, to a device of the character herein described, such as may be effectively and conveniently employed in association with oil wells, and the like.

The principal object of the invention is to provide a separating device whereby the oil and the gas usually associated with the same, are separated and delivered to the surface through the medium of independent channels.

A further object of the invention is to provide a separating device which is responsive to the variations of level of the oil in the lower end portion of the well casing, and which therefore, is entirely self-functioning.

Another object of the invention is to provide a separating device which may be readily and conveniently applied to or removed from the well casing.

An additional object of the invention is to provide a separating device which is simple in construction and operation, and which cannot easily become damaged.

A still further object of the invention is to provide a device which may be readily disassembled for purposes of cleaning, inspection or repair.

With the above more important objects in view, and such other objects as may become apparent as this specification proceeds, the invention consists essentially of the arrangement and construction of parts as illustrated in the accompanying drawings, in which:

Figure 1 is a cross-sectional view of the well casing, illustrating the invention in situ therein.

Figure 2 is a cross-sectional view of the invention.

Figure 3 is a further cross-sectional view, taken in the plane of the line 3—3 in Figure 2, and

Figure 4 is a cross-sectional view, taken in the plane of the line 4—4 in Figure 2.

Like characters of reference are used to designate like parts in the specification and throughout the several views.

Referring now to the accompanying drawings in detail, the invention embodies in its construction, an elongated, cylindrical jacket 5, the same being configured substantially as shown and provided at its upper end with an internally threaded adaptor neck 6.

The conventional pump piping 7 is threaded at its lower end into a suitable coupling 8, the latter in turn, being connected to a further length of pipe 9, as is best shown in Figure 2. It will be noted that the adaptor neck 6 is mounted adja-

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cent the coupling 8 at the upper extremity of the pipe 9, and the latter extends to the lower end portion of the jacket 5, for a purpose hereinafter more fully set forth.

A suitable seal or packing 10 is positioned intermediate the ends of the jacket 5 between a pair of retaining flanges 11, the seal 10 being in slidable engagement with the inner surface of the conventional well casing 12.

A liquid valve 13, provided with a suitable packing plate or gasket 14, is hingedly connected as at 15 to the lower end of the pipe 9, whereby the end of the latter may be effectively opened or closed. A gas valve 16 is hingedly connected as at 17 to the jacket 5, above the aforementioned seal 10. Both the valve 13 and the valve 16 are provided with actuating cranks or arms 18, and a valve rod 19 is pivotally connected at the ends thereof to the two arms, as is best illustrated in the accompanying Figure 2.

A pair of stops, assuming the form of the collars 20, are positioned in a spaced relationship on the valve rod 19, and a float 21 is slidably positioned in the jacket 5. This float is formed with a central bore 22 and with a relatively smaller passage 23, these being adapted to slidably receive the aforementioned pipe 9 and the valve rod 19 respectively. It will be noted that the float 21 engages the portion of the valve rod 19 between the two stops 20.

The lower end portion of the jacket 5 is formed with a plurality of passages or openings 24, these communicating with the interior of the casing 12, below the seal 10.

When the invention is placed in use, the separator as a whole, is lowered to the bottom of the casing 12 by means of the piping 7. The oil in the casing 12 will enter the jacket 5 through the openings 24 and the float 21, which heretofore has been resting on the lower of the stops 20, will be raised upwardly until it engages the upper stop. This stop and the associated rod 19 will then be lifted in the direction of the arrow 25, thus causing the openings of the valves 13 and 16.

The oil in the lower end of the jacket 5 may then enter the pipe 9 and be pumped to the surface through the medium of the piping 7.

Any gas which may have entered the jacket 5 together with the oil, will gather in the upper portion of the jacket and pass into the casing 12 through the valve 16. The gas is then conveyed upwardly through the casing 12, to the ground level. It will be noted that in this

manner, the gas and oil are effectively separated and delivered to the ground level in independent channels.

It should be understood that normally, the float 21 will rest upon the lower of the stops 20, thus retaining the valves 13 and 16 in their closed positions.

When it is not desired to deliver gas to the ground surface, the tie rod 19 may be disconnected from the valve 16, thereby leaving only the valve 13 in the operating position. A certain amount of gas may gather in the upper portion of the jacket 5, this effectively assisting in forcing, so to speak, the oil upwardly through the pipes 9 and 7, and thus conserving the gas in the sand.

It is believed that the advantages and use of the invention will be clearly understood from the foregoing disclosure and accordingly, further description thereof at this point is considered unnecessary.

While in the foregoing there has been shown and described the preferred embodiment of this invention it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

What I claim as my invention is:

1. A gas-liquid separating device for wells, comprising in combination, a substantially upright well casing, a concentrically disposed jacket provided in said casing and having a closed lower end, an annular seal mounted intermediate the ends of said jacket and frictionally engaging the inner wall of said casing, a concentrically disposed liquid tube positioned in said jacket, the upper end of said jacket being sealed to said tube, a valve at the lower end of said tube, said jacket being formed with passages communicating with the interior of said casing, said passages being disposed above and below said seal, said jacket receiving liquid therein through the lower of said passages, and liquid level responsive means in said jacket for controlling said valve.

2. A gas-liquid separating device for wells, comprising in combination, a substantially upright well casing, a concentrically disposed jacket provided in said casing and having a closed lower end, an annular seal mounted intermediate the ends of said jacket and frictionally engaging the inner wall of said casing, a concentrically disposed liquid tube positioned in said jacket, the upper end of said jacket being sealed to said tube, a valve at the lower end of said tube, a further valve in said jacket above said seal, said jacket being formed with passages disposed below said seal, said jacket receiving liquid therein through said passages, and liquid level responsive

means in said jacket for controlling said valves.

3. A gas-liquid separating device for wells, comprising in combination, a substantially upright well casing, a concentrically disposed liquid tube provided in said casing, a cylindrical jacket sealed at its upper end to the lower end portion of said tube and having a closed lower end, said tube portion extending longitudinally in said jacket, an annular seal mounted intermediate the ends of said jacket and frictionally engaging the inside wall of said casing, a valve mounted at the lower end of said tube, said jacket being formed with an opening disposed above said seal and with a plurality of passages disposed below said seal, said opening and passages connecting the interior of said jacket with the interior of said casing, a further valve provided on said jacket in register with said opening, a float positioned in said jacket exteriorly of said tube, and means for operatively connecting said float to said valves.

4. A gas-liquid separating device for wells, comprising in combination, a substantially upright well casing, a concentrically disposed liquid tube provided in said casing, a cylindrical jacket sealed at its upper end to the lower end portion of said tube and having a closed lower end, said tube portion extending longitudinally in said jacket, an annular seal mounted intermediate the ends of said jacket and frictionally engaging the inner wall of said casing, a flap valve mounted at the lower end of said tube, said jacket being formed with an opening disposed above said seal and with a plurality of passages disposed below said seal, said opening and passages connecting the interior of said jacket with the interior of said casing, a further flap valve provided on said jacket in register with said opening, a control crank associated with each of said valves, a valve rod operatively connecting said cranks together, an annular float positioned in said jacket and slidably engaging said tube, said float being formed with an eccentrically disposed bore, said valve rod extending slidably through said bore, and a pair of stops secured to said rod above and below said float, said float being engageable with said stops and controlling said valves through the medium of said rod.

TUGGLE SEAGO.

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