March 20, 1928. 1,663,411

W. M. LITTLE ET AL

SEPARATOR

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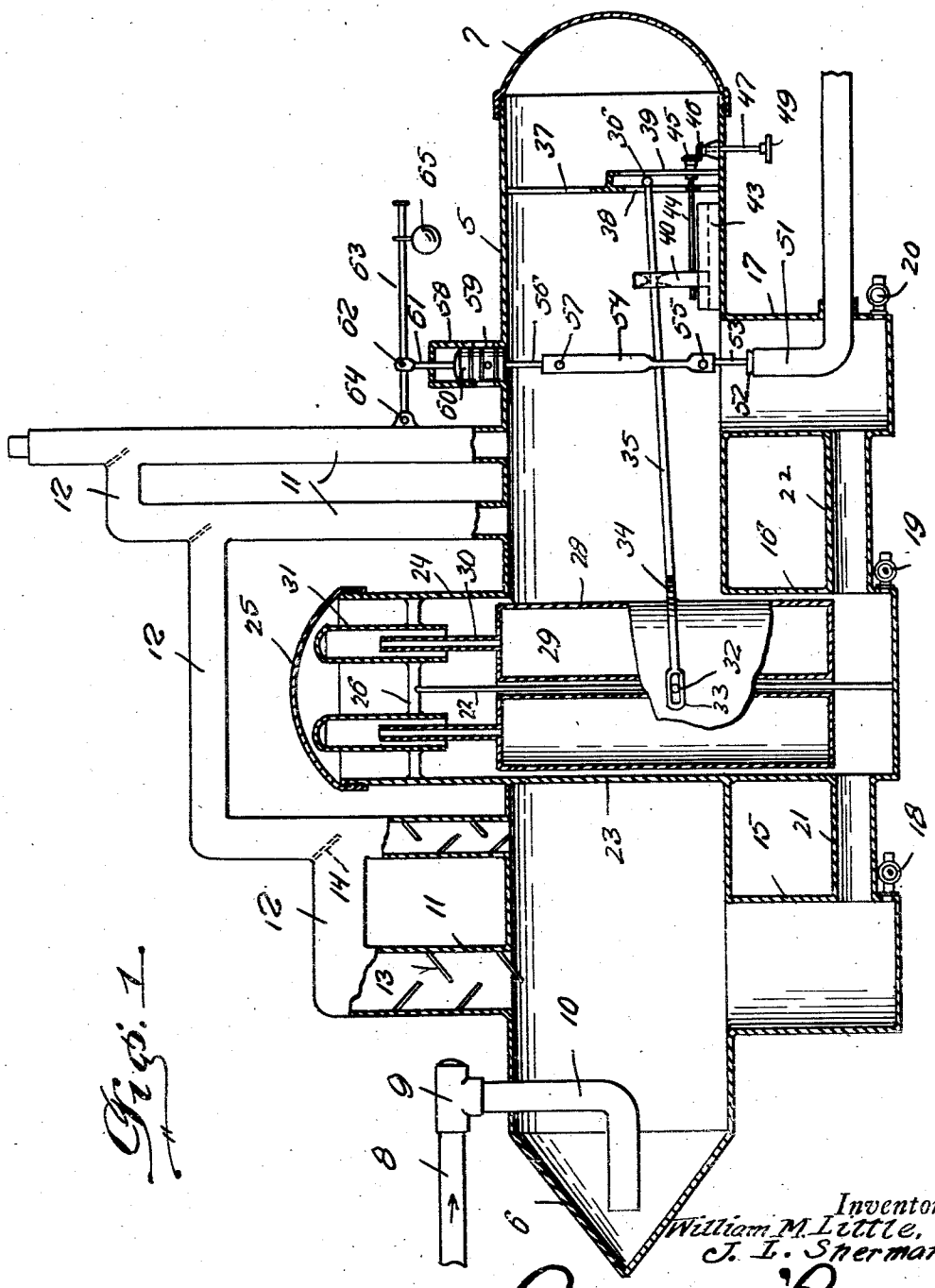


Fig. 1.

Inventors
William M. Little,
J. I. Sherman,
By Clarence A. O'Brien
Attorney

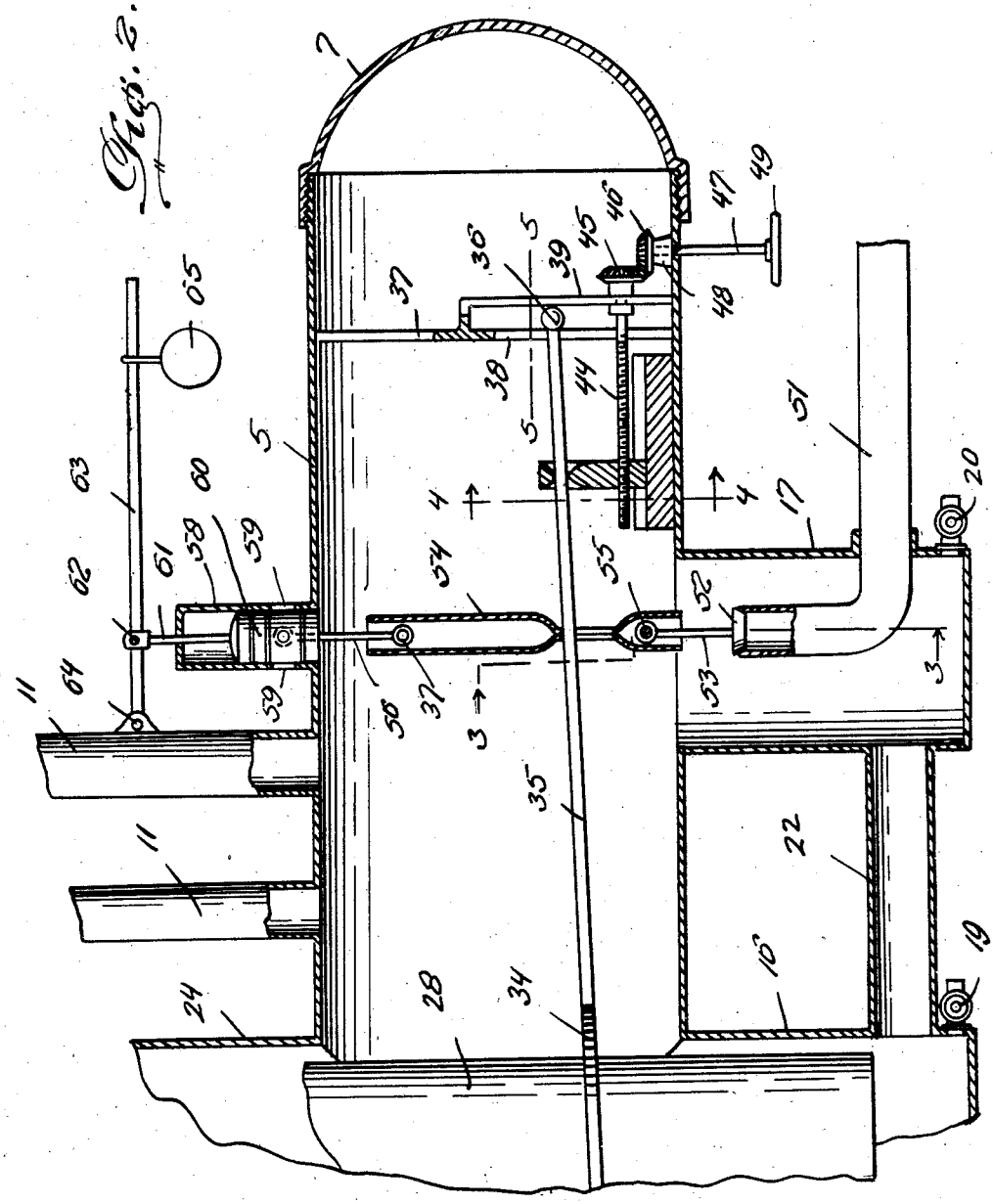
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SEPARATOR

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Fig. 2.



Inventors
William M. Little,
J. I. Sherman,

By Clarence A. O'Brien

Attorney

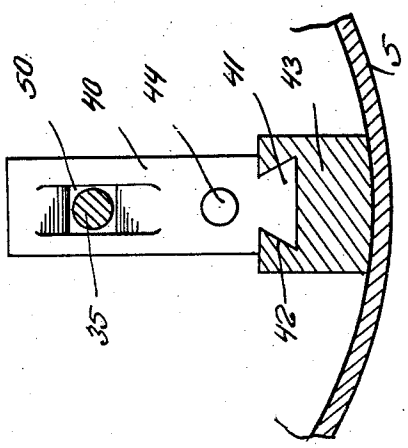
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SEPARATOR

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Fig. 4.



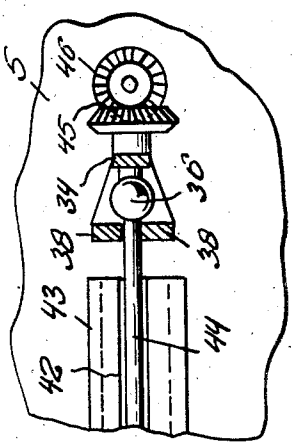
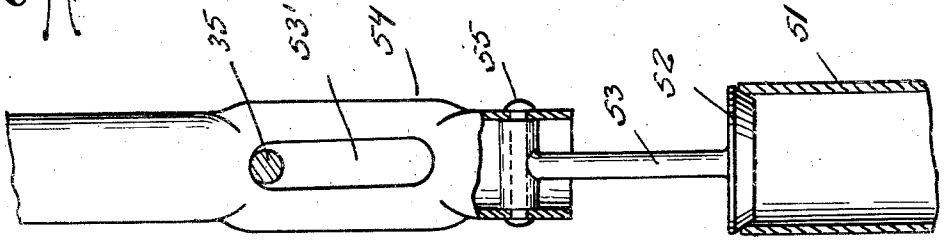


Fig. 5.

Fig. 3.



Inventors
William M. Little,
J. L. Sherman,

By Clarence A. O'Brien

Attorney

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UNITED STATES PATENT OFFICE.

WILLIAM M. LITTLE AND JESSIE L. SHERMAN, OF NORPHLET, ARKANSAS.

SEPARATOR.

Application filed October 9, 1926. Serial No. 140,500.

The present invention relates to a separator constructed for separating oil, gas and water as it comes from the well in the form of crude oil.

An important object of the invention is to provide a device of this nature which is exceedingly convenient and compact in its construction and arrangement of parts and is thoroughly reliable and efficient in operation.

With the above and numerous other objects in view as will appear as the description proceeds, the invention resides in certain novel features of construction, and in the combination and arrangement of parts as will be hereinafter more fully described and claimed.

In the drawings:

Figure 1 is a longitudinal vertical section taken through the separator embodying the features of our invention,

Fig. 2 is an enlarged detail vertical section of one end thereof,

Fig. 3 is an enlarged detail section taken substantially on the line 3—3 of Fig. 2,

Fig. 4 is a detail vertical section taken substantially on the line 4—4 of Fig. 3 on an enlarged scale,

Fig. 5 is an enlarged detail section taken substantially on the line 5—5 of Fig. 2.

Referring to the drawings in detail, it will be seen that the numeral 5 denotes an elongated cylindrical casing which merges at one end into a cone-shaped head 6 and at its other end has threaded thereon a concavo-convex head 7. A crude oil pipe is denoted by the numeral 8 and is connected by a fitting 9 to an L-shaped pipe 10 which terminates with one branch coaxially alined with the drum and the cone-shaped head 6 and pointing towards the apex of the head 6 so that the oil will be broken up to some extent by impact with the interior surface of the head 6. A plurality of vertical tubes 11 rise from the drum 5 and are connected by horizontal tubes 12. The vertical tubes 11 have arranged therein a plurality of baffle plates 13. Baffle plates 14 are arranged at the junctures of the rear ends of the horizontal tubes 12 with the vertical tubes 11 as indicated in dotted lines in Fig. 1.

A drum 15 depends from the forward portion of the casing 5 and has its bottom closed. A drum 16 depends from the intermediate portion of the casing 5 and has its bottom closed. A drum 17 depends from the rear portion of the casing 5 and has its bottom closed. All three of the drums, 15, 16 and 17 are provided with valved outlets shown at 18, 19 and 20 respectively. The bottom portion of the drum 15 is connected with the bottom portion of the drum 16 by a pipe 21. The bottom portion of the drum 16 is connected with the bottom portion of the drum 17 by a pipe 22. A partition 23 is disposed in the casing 5 immediately above the forward portion of the drum 16 as is clearly shown in Fig. 1. A drum 24 rises from the top of the casing 5 and is of substantially the same diameter as the drum 16 and is coaxially alined therewith. A concavo-convex head 25 is threaded on the upper end of the drum 24. A bar 26 extends diametrically across the interior of the drum 24 and has a vertical guide rod 27 depending therefrom and engaged centrally on the bottom of the drum 16. A hollow cylindrical float 28 has a tube extending axially therethrough as at 29 for receiving the guide rod 27. Tubes 30 rise from the hollow drum 28 and move in inverted cup-shaped members 31 mounted on the bar 26. Pins 32 project radially from opposite sides of the drum 28 and pierce the slotted extremities 33 of a yoke 34 formed integrally on the ends of a beam 35. The other end of this beam 35 merges into a pawl 36. A post 37 extends vertically in the rear portion of the casing 5 and the lower end thereof is bifurcated as at 38 and has a rearwardly spaced stop leg 39. The pawl 36 is adapted to move between the bifurcations 38 and stop leg 39. A fulcrum block 40 has a trapezoidal-shaped tenon 41 which is slidably mounted in a similarly-shaped mortise 42 in the upper edge of a longitudinally extending support 43 mounted in the bottom of the casing 5 rearwardly of the drum 17. A threaded shaft 44 is engaged with the block 40 and is journaled in the stop leg 39 and has a beveled pinion 45 at its rear end with a beveled pinion 46 on the upper end of a shaft 47 journaled through the bottom of the casing as at 48. The exterior or bottom end of the shaft 47 has an operating wheel 49 thereon. It will be seen that the fulcrum block may be moved longitudinally of the casing by rotation of the wheel 49 through the intermediacy of the shaft 47, the pinions 46 and 45 and the screw shaft 44. This fulcrum block 40 is provided with an opening 50 through which the beam 35 projects. An

oil outlet pipe 51 extends through the side of the drum 17 and upwardly therein and terminates in a valve seat for receiving valve 52 having a stem 53. A tubular connecting member 54 receives the upper end of the valve stem 53 which is connected thereto by a wrist pin 55. A stem 56 extends into the upper end of the tubular connecting member 54 and is connected thereto by a wrist pin 57. A closed drum 58 rises from the cylindrical casing 5 and has diametrically opposed openings 59. Slidably mounted in the dome or drum 58 is a piston valve 60 connected with the stem 56. Another stem 61 extends upwardly from the piston valve 60 through the top thereof and is pivoted as at 62 to a rod 63 pivoted as at 64 at one end to an intermediate portion of one of the vertical tubes 11. A weight 65 is slidable on this rod 63 so as to normally maintain the piston valve closed.

It is thought that the device has been described in sufficient detail to thoroughly understand the operation thereof. As is well known, the oil as it comes from the well includes a certain amount of gas and water and as this mixture enters through the pipe 10 it is broken up to some extent by impact against the conical head 6. As this mixture collects in the casing and passes from one drum to the other through the connections 21 and 22, it will be seen that the water will settle at the bottom, the oil rising to the top while the gas will escape through the tubes 11 and 12, the baffles tending to separate any oil which may be suspended in the gas so that the same will trickle down into the gas. As the level of the oil rises, it will be seen that the float 28 will be caused to rise. This will happen depending on the position of the weight 65 as is apparent. When the float 28 rises it swings the beam 35 thereby lifting upwardly on the stem 56 and its valve 52 so that the oil will flow off through the pipe 51. From time to time the water may be drained off through the valve drains 18, 19, and 20. Should the gas in the casing become excessive at any time, it will be seen that it will raise the piston valve 60 so as to allow the gas to escape through the openings 59 and also allow the oil to flow out through the pipe 51 thereby increasing the gas capacity of the casing 5 so as to reduce the pressure. The float 28 is controlled in its operation by the shifting of the fulcrum block 40 as previously indicated.

It is thought that the construction, operation, and advantages of this invention will now be clearly understood by those skilled in this art without a more detailed description thereof. It will be readily apparent that we have provided an efficient and substantial device of the character described and while this specification manifests in detail the preferred construction of the invention, we do not wish to be understood as limiting ourselves to the specific details of construction and arrangement of parts as herein described and illustrated, as it is manifest that variations and modifications may be resorted to in the features of construction and arrangement of parts, in the adaptation of the device to various conditions of use without departing from the spirit and scope of the invention. We therefore reserve the right to all such variations and modifications as properly fall within the scope of our invention as hereinafter claimed.

From the foregoing, it is thought that the construction of our invention will be clearly understood, and, therefore, a more extended explanation has been omitted.

Having thus described our invention, what we claim as new is:—

A device of the class described, including, in combination, an elongated horizontal casing, an oil pipe leading into the casing, water outlet means associated with the casing, gas outlet means associated with the casing, an oil outlet pipe leading into the casing and terminating in a valve seat, a valve associated with the seat, a stem rising from the valve, a connector, a wrist-pin connection between the connector and the valve stem, a drum rising from the casing and having apertures, a piston rod slidable in the drum having a stem connected with the connector, said connector having an opening, a beam extension through the opening, a float in the casing, means connecting the float with one end of the beam, a fulcrum block for the beam, and means for adjusting the fulcrum block.

In testimony whereof we affix our signatures.

WILLIAM M. LITTLE.
JESSIE L. SHERMAN.