No. 637,148. Patented Nov. 14, 1899.

A. P. McBRIDE.

GAS, OIL, AND WATER SEPARATOR.

(Application filed Mar. 14, 1899.)

(No Model.)

Fig. 1.

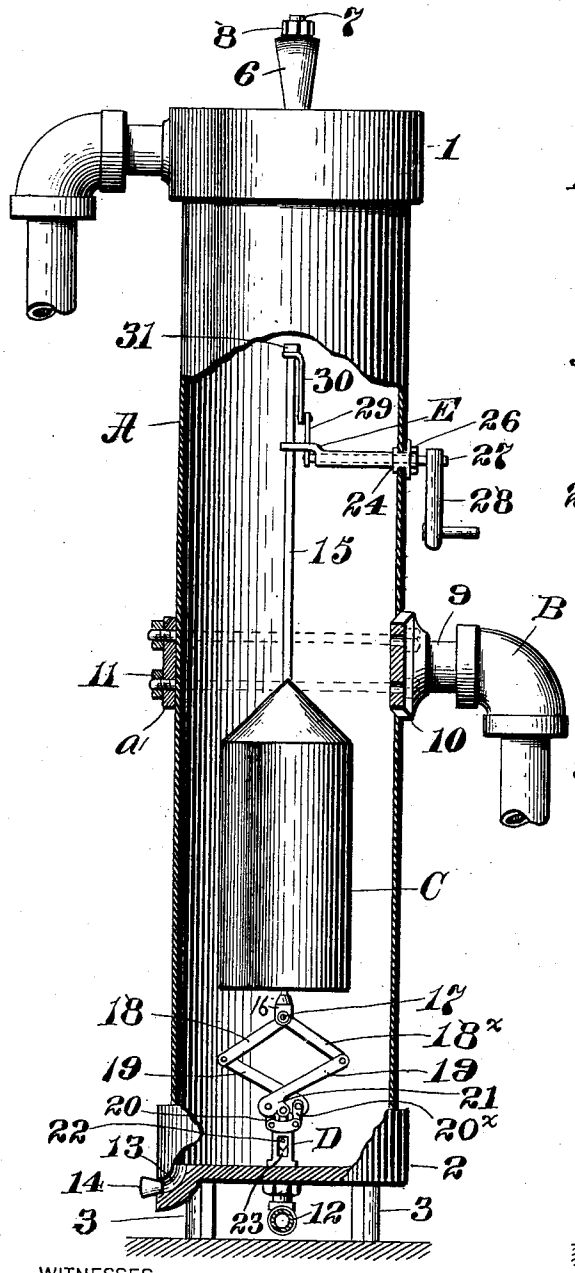
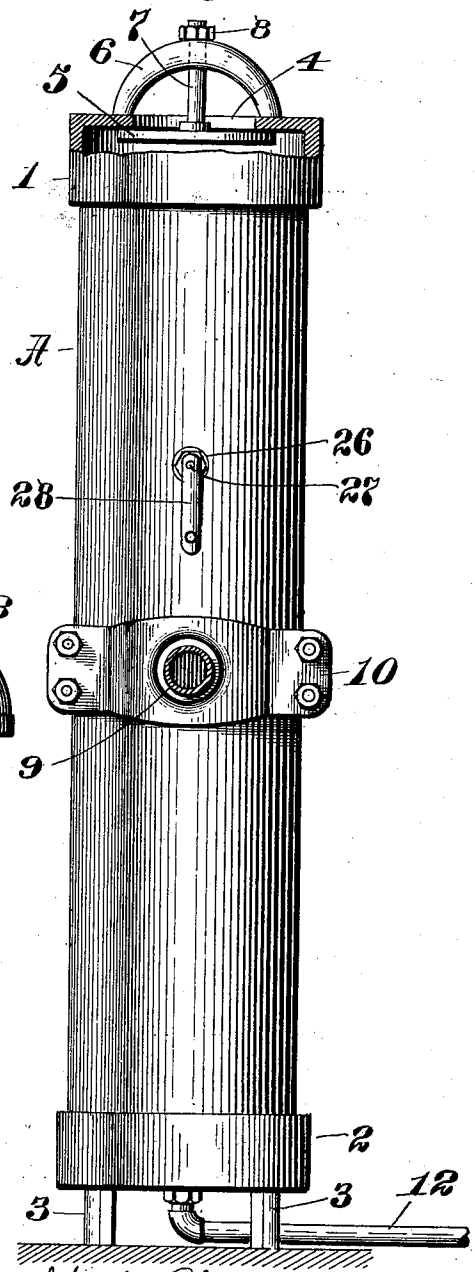


Fig. 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

ALBERT P. McBRIDE, OF INDEPENDENCE, KANSAS.

GAS, OIL, AND WATER SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 637,148, dated November 14, 1899.

Application filed March 14, 1899. Serial No. 709,039. (No model.)

To all whom it may concern:

Be it known that I, ALBERT P. McBRIDE, a citizen of the United States, residing at Independence, in the county of Montgomery and State of Kansas, have invented certain new and useful Improvements in Gas, Oil, and Water Separators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has relation to improvements in gas, oil, and water separators; and the objects are to provide improved leverage for the valve, to provide improved means for access to the casing for cleaning or withdrawing the precipitated deposits, to provide a novel and improved guide for the stem of the bell, and means for manipulating the bell, if required, and generally to simplify the construction of the apparatus, all as will be hereinafter fully specified, and particularly pointed out in the claims.

I have fully and clearly illustrated the invention in the accompanying drawings, to be taken as a part hereof, and wherein—

Figure 1 is a vertical sectional view of a tank or vessel with my improvements applied therein, wherein are shown the bell, the valve-operating levers, the valve-chamber, and the crank mechanism for lifting or depressing the mechanism, if required. Fig. 2 is a view in elevation of the apparatus, partly in section, to show the means for securing the top plate in the top opening.

Referring to the drawings, A designates the tank or vessel, of such size, capacity, and dimensions as may suit it to the uses intended. This vessel A consists of a suitable metal cylindrical shell, a substantial cap or cover 1, secured to the upper end of the shell, and a bottom support 2, provided with legs 3 to support the apparatus. The cap 1 is detachably secured to the top of the casing by any proper means, as by bolts let through the engaging parts, or the overlapped portions may be provided with coincident screw-threads, and in the center of the cap is formed an opening 4, constituting means for obtaining access to the interior of the casing for such purposes as may be required, as for removing accumulations of debris and for placing, removing, or arranging the inclosed mechanism. The opening 4 is closed by a circular plate 5, which is arranged within the casing and engages with its upper edge under and against the surrounding edge of the opening 4, substantially as seen in Fig. 2 of the drawings. The plate 5 is held in closed and fixed position by means of an arch 6, the feet of which rest on the surface of the cap, and in the apex or center of the arch is formed a vertical hole through which the upper portion of a rod 7 loosely passes, the lower end of which rod is suitably secured in the center of the plate 5 and the upper end of which is screw-threaded and projects through the hole in the apex of the arch and is provided with a nut 8, as shown. It will be perceived that by screwing the nut down it will draw the rod up, and with it the plate, thereby clamping the plate in the cap and effectually sealing the opening.

In the top of the casing A, at the side, is suitably secured the outlet-pipe *b*, through which the gas or oil is discharged and led to such point as may be required or desired.

B designates the inlet-pipe, through which the material is supplied to the tank to be subjected to the operation or separable effects of the apparatus. The connecting-nipple or joint-piece 9 is composed of a plate 10, bent to conform to the circular face of the casing, and has its ends extended and projecting beyond the terminals of the radii of the shell, as shown in Fig. 2 of the drawings, the ends being provided with bolt-holes through which are passed the ends of clamping stirrups or rods, which extend about the exterior of the casing and are clamped against a plate *a* by nuts 11 on the ends thereof. In the center of the plate or piece 10 is formed the nipple 9, to which the pipe B is connected by any suitable joint, and of course the nipple opens into the casing.

In the bottom of the casing or tank is secured an outlet or discharge pipe 12, which has communication with and into the valve-chamber and through which the surplus water is discharged, and in the bottom is formed a passage 13, closed by a plug 14, the passage

forming a drain through which the contents of the vessel may be discharged, if desired, and also to serve as means for drawing off accumulated debris from the tank.

C designates the bell or float, consisting of a metal shell having a closed conical top and an open bottom. This bell is rigidly secured to a vertical rod 15, which passes through the apex of the conical top, and the parts there secured together by any well-known means. The rod 15 extends, preferably, below the lower edge of the bell and is formed at its end with a slotted head 16, having a pivot-bolt 17 projected through it and suitably fastened therein. To the head 16 are pivotally connected the ends of the upper bars or limbs 18 $18^{\times}$ of lazy-tong levers, the lower bars or limbs 19 $19^{\times}$ of which are crossed and have their ends pivotally connected to the upper ends of links 20 $20^{\times}$, having their lower ends pivotally connected to ears on the valve-chamber D, substantially as seen in the drawings. On the bars 19 $19^{\times}$ are formed coincident or alining perforated ears 21, through which a pivot-bolt is passed and suitably secured, and on this bolt is hung the valve 22, which is a straight piece of metal slidingly arranged in a vertical way in the valve-chamber, the lower end of the valve being conical to take in a coincident seat in the valve-chamber. The vertical passage of the valve-chamber communicates with the water-discharge pipe, and in order that this passage may have communication with the contents at the bottom of the vessel a transverse passage 23 is formed through the chamber. It will now be perceived that when the bell is moved up it will extend the lazy-tongs and lift the valve vertically from its seat in the chamber and that when the water has been discharged and the bell descends the lazy-tongs will be depressed and the valve be moved down into the seat and the flow be stopped. This construction and arrangement of valve-levers insure operation of the valve, which sometimes sticks in the passage and requires force to operate it; but by this system of leverage a light pressure or weight operates the valve with certainty.

E designates the guide for the stem of the bell or float, consisting of a hollow tube or sleeve formed with an aperture in the end, through which the stem of the bell passes; or the end may be forked and the stem pass between the forks. On the sleeve is formed an annular collar or shoulder 24, adapted to set tight against the inner face of the casing, the projecting end of the tube being screw-threaded to take a collar 25, adapted to set tight against the outer face of the casing and locked and held by a jam-nut 26, substantially as seen in the drawings. In the bore of the tube is fitted to turn therein a rod 27, on the outer end of which is secured a crank 28, and to the inner end of the rod 27, which projects beyond the end of the tube, is rigidly connected a curved arm 29, having its outer end pivotally connected to a bar or lever 30, formed with a loop at its upper end, through which the end of the bell-stem passes, and the loop bearing against a nut 31 on the upper end of the bell-stem, substantially as indicated in the drawings. It will be perceived from the foregoing description that if from any cause the interior mechanism fails to operate freely or stops altogether the fact may be ascertained and remedied by turning the crank, which, through the connections to the bell-stem, will move the bell and positively operate the mechanism or free it by movement from impediment.

It will be perceived from the foregoing description, taken in connection with the drawings, that when the crude or mixed material is delivered into the vessel or tank the separation of the constituent elements will be naturally effected, the water assuming the lower position in the vessel, with the gas or oil occupying the upper portion, and that if the water accumulates to such an extent as to enter the chamber of the bell or float, and thus compress the air contained therein to create an upward movement of the bell, the valve will thereby be opened and the surplus water discharged, the discharge continuing until the pressure in the bell is relieved to permit the bell to descend, and thus close the valve by the action of the levers. In the meantime the oil or gas is discharged continuously through the outlet-pipe of the vessel.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a gas, oil and water separator, the combination with the vertically-movable bell provided with a rod projected vertically and centrally through the top of the bell and rigidly secured therein, and a valve operatively connected to the lower end of said rod, of a tubular arm horizontally projected from the side of the casing and having said bell-rod slidingly arranged in its inner free end, a rotary rod in the tube, a jointed lever connected to the inner end of the said rotary rod and to the bell-rod, and means outside of the casing to turn the rotary rod, substantially as described.

2. A gas, oil and water separator, comprising an outer casing or tank, an inlet-pipe leading therein, an outlet-pipe leading therefrom, a valve-controlled discharge-pipe at the bottom of the tank, a valve-chamber in the lower portion of the tank, a vertically-movable valve in the valve-chamber, a bell in the tank having an open lower end and a closed conical top, a bell-rod projected centrally through the conical top and rigidly secured therein, lazy-tong levers having their upper limbs pivotally connected to the lower end of the bell-rod and their lower limbs crossed and pivotally connected to the top of the valve-chamber and to the valve at the point of intersec-

tion, a tubular arm horizontally projected into the tank at the upper portion of the bell-rod and formed at its inner end with guides through which the bell-rod slides, a rotary rod in the tubular arm, a jointed lever having one end connected to the inner end of the rotary rod and the other end connected to the bell-rod, and means outside of the casing to turn the rotary rod, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT P. McBRIDE.

Witnesses:
O. L. KIMBLE,
M. F. WOOD.