May 3, 1932. E. A. SHOWERS ET AL 1,856,662

OIL SEPARATOR

Filed Dec. 12, 1929 2 Sheets-Sheet 1

Fig. 1.

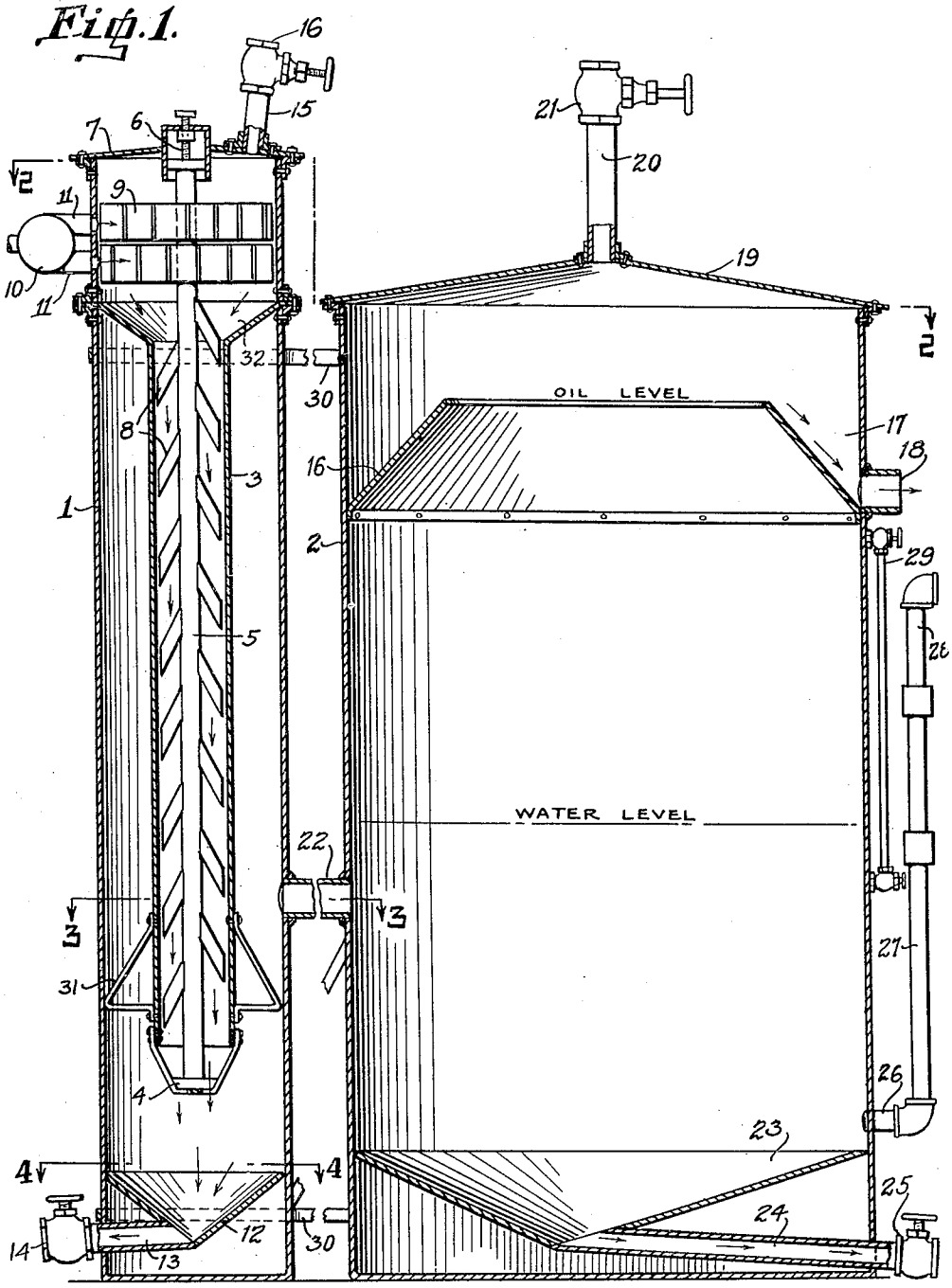

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Fig. 2.

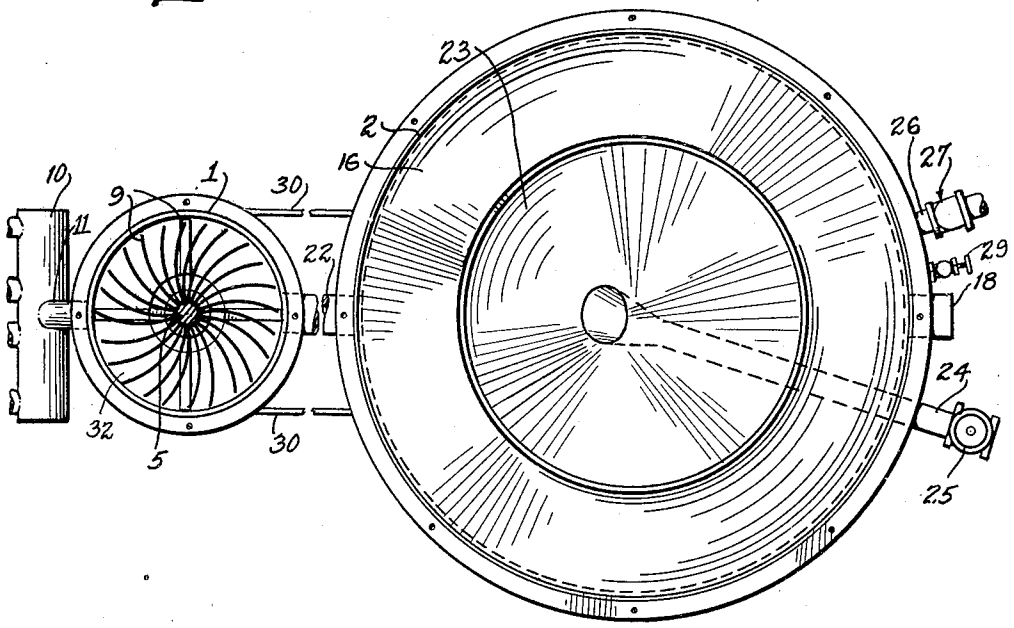


Fig. 3.

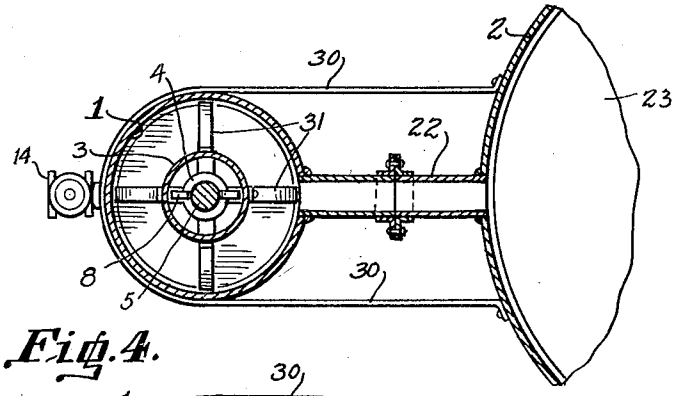
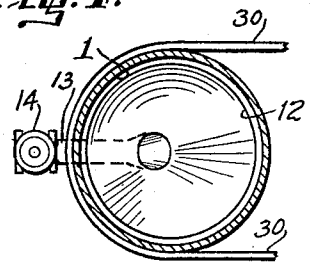


Fig. 4.



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1,856,662

UNITED STATES PATENT OFFICE

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OIL SEPARATOR

Application filed December 12, 1929. Serial No. 413,559.

This invention relates to a device for separating water and solid impurities from oil.

The object of the invention is to provide a simple and improved device by means of which crude oil can be readily and efficiently separated from water and solid impurities.

The invention consists in the new and improved construction, arrangements and combinations of parts hereinafter more particularly described and claimed.

In the drawings:

Figure 1 is a vertical transverse section of a diagrammatic character;

Figure 2 is a horizontal cross-section taken on the line 2—2 of Figure 1;

Figure 3 is a horizontal fragmentary cross-section taken on line 3—3 of Figure 1; and

Figure 4 is a horizontal fragmentary cross-section taken on line 4—4 of Figure 1.

In accordance with the drawings two chambers, 1 and 2, are provided which may be conveniently of cylindrical shape, chamber 1 of lesser diameter than chamber 2 and these chambers are associated by suitable frame work 30 and their interiors are in communication as by a tubular connection 22 positioned slightly below the vertical center.

Chamber 1 is provided with an interior tubular member 3 having a flaring or funnel top 32 positioned slightly below the top of chamber 1 and having its lower end open and centrally positioned within chamber 1 as by a frame member 31. Chamber 1 is covered by a top 7 provided with centrally positioned bearing 6 and with an outlet pipe 15 associated with a valve 16 to provide the escape of gases from the chamber.

A bearing 4 is mounted on the bottom of tubular member 3 and a vertical shaft 5 is journalled in bearings 4 and 6, said shaft 5 being provided with a plurality of stirring vanes 8 throughout the length of tubular member 3. Upon the upper end of shaft 5 and above the funnel mouth 32 of the tubular member 3 are mounted impact wheels 9. An oil header 10 into which the crude oil is fed is connected with chamber 1 by inlet nozzles 11 adapted to direct the oil mixture against impact wheels 9 to rotate the same.

In the bottom of chamber 1 is positioned a funnel 12 associated with an outlet pipe 13 controlled by valve 14 through which sediment deposited from the oil mixture within chamber 1 can be withdrawn at intervals.

Chamber 2 is provided at its bottom with a similar funnel member 23 associated with an outlet pipe 24 and valve 25 through which sediment deposited within chamber 2 may be withdrawn at intervals. A top 19 is provided for chamber 2, having a gas outlet 20 controlled by valve 21. Within chamber 2 and spaced slightly from the top thereof is an annular flange 16 defining an annular gutter 17. Said annular gutter 17 communicates with an outlet overflow pipe 18. A glass depth gage 29 is mounted upon the side of chamber 2 to permit observation of the depth of the contents of the chamber.

A vertical water stand pipe 27 communicates with chamber 2 adjacent its bottom as at 26 and is preferably associated with short length pipes 28 by means of which this vertical water stand pipe can be adjusted in length for the purpose of varying the hydrostatic head operating to control the level of oil, and the rate of flow of oil through the overflow pipe 18. The effective length of the stand pipe 27 can also be varied by rotating the pipe 27 about the short pipe 26 to raise or lower the water line level between the oil and water on chamber 2, in order to insure a gentle flow of oil over the top of flange 16 and discharge thereof through overflow pipe 18.

In operation the oil which is to be separated is fed into header 10 and thence through inlet nozzles 11 against impact wheels 9, thus rotating shaft 5 and stirrer blades 8. The oil mixture then passes downwardly through funnel mouth 32, through tubular member 3 and out at the bottom of said tubular member into chamber 1, in which the coarser sediment will precipitate into funnel 12.

From chamber 1 the mixture largely water and oil will pass through tubular connection 22 into chamber 2, in which chamber the oil will rise to the top and the water settle to the bottom and in which chamber further precipitation of any remaining sediment will occur with the deposit of such sediment in

the funnel 23. The water in the lower part of chamber 2 will rise in the water stand pipe 27 to create a head pressure sufficient to raise the oil in the upper part of chamber 2 to the level of the top of the outlet flange member 16, over which flange member the oil will gently overflow to be drawn off through overflow pipe 18.

Various modifications in the precise structure and arrangement of particular parts will readily suggest themselves to those skilled in the art but all within the scope of the present invention.

Having thus fully described our invention, we claim:

1. Apparatus for continuously separating liquids of different specific gravities from a mixture of such liquids, comprising a settling tank in which liquids from said mixture settle in superposed layers and in accordance with their specific gravities, a frusto-conical cutting ring secured in said tank near the upper end thereof, a valve control sediment removing hopper at the bottom of said tank, means for feeding said mixture into said tank between the ends thereof, means for discharging the upper layer of liquid overflowing from the top of said cutting ring, a pipe connected to said tank to discharge liquids from the lower of said layers, said pipe being adjustable to control the level of separation between said layers and to control thereby the rate of discharge of the upper layer of liquids through said discharging means.

2. Apparatus for separating oil from water in a mixture of oil and water, comprising an agitating chamber and a settling chamber arranged vertically and parallel to each other, means at the top of said agitating chamber for feeding said mixture to said agitating chamber, means for agitating said mixture in the vertical column thereof formed in said chamber, a valve controlled sediment remover at the bottom of said agitating chamber, a pipe for conducting the agitated mixture from the agitating chamber into the settling chamber, a valve controlled sediment remover at the bottom of said settling chamber, a frusto-conical oil cutting ring near the top of said settling chamber, a discharge outlet on said settling chamber to discharge oil flowing down the inclined side of said ring, a discharge pipe connected to said settling chamber near the lower end thereof to conduct water from the water layer, said discharge pipe being adjustable to vary the hydrostatic head acting on the superposed layers to control the rate of discharge of oil from said chamber.

In testimony whereof we affix our signatures.

EDWARD A. SHOWERS.
LLOYD A. LONG.