Nov. 10, 1931. J. S. ADAMS 1,831,473

DEVICE FOR SEPARATING OIL FROM WATER

Filed Nov. 20, 1930 2 Sheets-Sheet 1

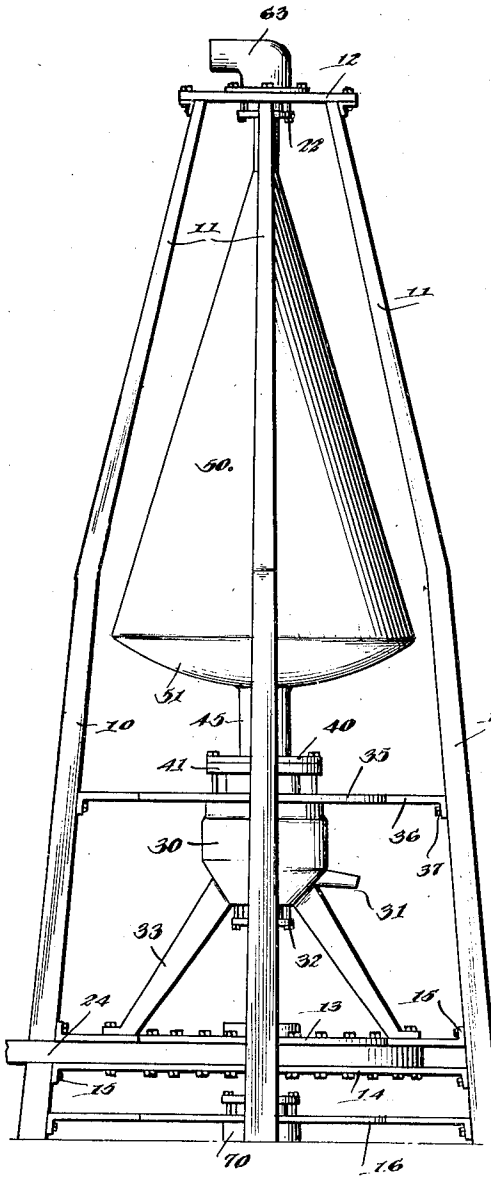


Fig. 1.

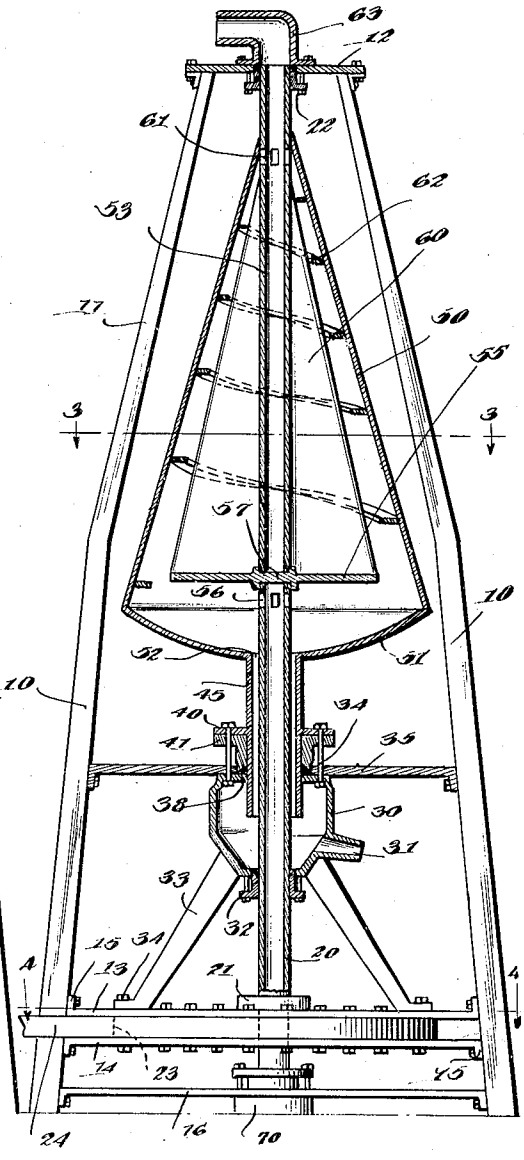


Fig. 2.

WITNESS
C. Howard Mayn

INVENTOR
J. S. Adams,
BY Munn & Co.
ATTORNEY

Nov. 10, 1931. J. S. ADAMS 1,831,473

DEVICE FOR SEPARATING OIL FROM WATER

Filed Nov. 20, 1930 2 Sheets-Sheet 2

Fig. 3.

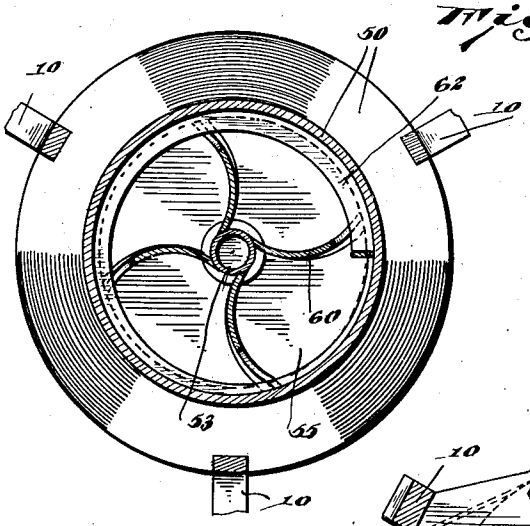


Fig. 4.

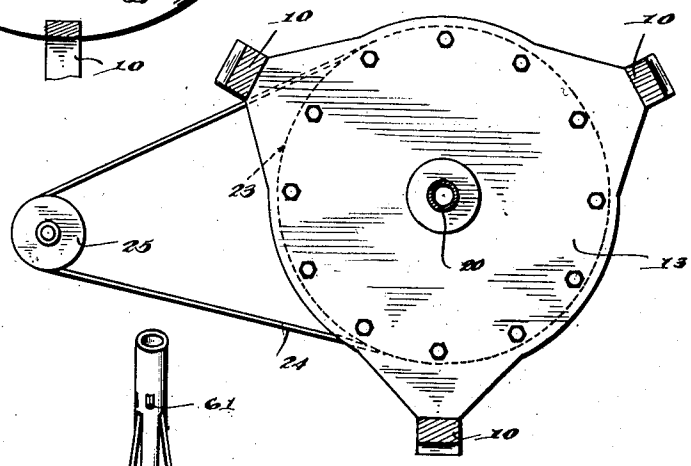
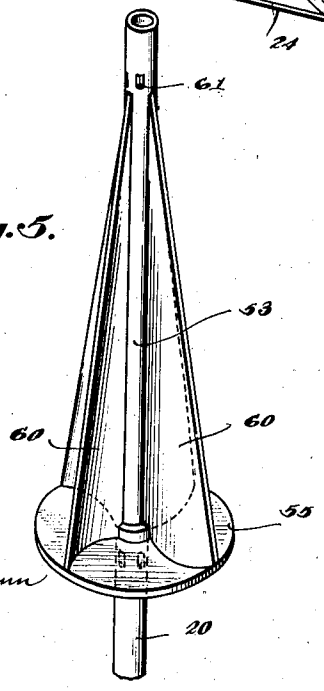


Fig. 5.



WITNESS
E. Howard Mann

INVENTOR
J. S. Adams,
BY Munn & Co.
ATTORNEY

Patented Nov. 10, 1931 1,831,473

UNITED STATES PATENT OFFICE

JAMES SHANNON ADAMS, OF BORGER, TEXAS, ASSIGNOR TO A. B. C. MANUFACTURING CORPORATION, A CORPORATION OF TEXAS

DEVICE FOR SEPARATING OIL FROM WATER

Application filed November 20, 1930. Serial No. 497,048.

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

An object of the invention is the provision of a device for separating oil from water without the use of any chemicals and without loss of gravity test.

A further object is the provision of a device which may be attached directly to an oil well, pipe lines, oil tanks or other receptacles containing crude oil, the crude oil being forced through the bottom of the device and being discharged into a conically-shaped container, where the liquids are given a centrifugal motion for forcing the water outwardly while permitting the oil to be collected at a central point and discharged therefrom, a spiral track being employed along the inner wall of the container for guiding the water downwardly toward the discharging opening.

Another object of the invention is the provision of a device for separating fluids of different specific gravities, the heavier liquid being thrown outwardly against the walls of a conical shaped container by centrifugal force, while the lighter liquids are permitted to flow to the center, from which they are withdrawn.

This invention will be best understood from a consideration of the following detailed description, in view of the accompanying drawings forming a part of the specification; nevertheless it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications which shall define no material departure from the salient features of the invention as expressed in the appended claims.

In the accompanying drawings:

Figure 1 is a view in elevation of an oil and water separator constructed in accordance with the principles of my invention;

Figure 2 is a vertical section of the separator;

Figure 3 is a horizontal section, taken along the line 3—3 of Figure 2;

Figure 4 is a horizontal section, taken along the line 4—4 of Figure 2; and

Figure 5 is a view in perspective of a device for causing centrifugal force to be applied to the liquids.

Referring more particularly to the drawings, 10 designates vertically disposed beams having their upper ends 11 bent inwardly and connected together by means of a plate 12. A pair of spaced plates 13 and 14 are provided with lugs 15 which are secured to the beams 10. Brace bars 16 connect the lower ends of the beams together below the plates 13 and 14.

A centrally disposed shaft 20 is carried by bearings 21 and 22, the bearing 21 being formed on the plate 13. A wheel or drum 23 is secured to the hollow shaft 20 and is driven by means of a belt 24 which in turn is driven by a pulley 25. The pulley may be revolved in any approved manner.

A receptacle 30 having a discharge spout 31 embraces the hollow shaft 20 and a packing 32 is carried by the receptacle 30 and seals the bottom of the receptacle where the shaft 20 passes through the same. Legs 33 are secured at 34 to the plate 13 and the upper ends of the legs are secured in any approved manner to the receptacle 30.

A plate 35 is provided with arms 36 which are secured at 37 to the beams 10. This plate is located adjacent the top 38 of the receptacle 30 and bolts 39 secure the top of the receptacle, and a flange 40 and a packing 41 to the plate 35. A tubular member 45 telescopes the hollow shaft 20 and extends downwardly through the packing 41 and a passage 38 of the receptacle 30 where the tubular member opens into said receptacle. It will be noted that the flange 40 is connected to or formed integrally with the member 45.

A conically-shaped housing 50 is located at the upper end of the separator and has a curved bottom portion 51 formed integrally with the tubular member 45. The tubular member is in open communication with the housing 50 through an opening 52. It will be noted that the larger end of the housing 50 is adjacent the tubular member 45 while the upper end tapers until it substantially merges toward the upper end 53 of the shaft 20, but said end is free from the shaft. A circular plate 55 is secured to the shaft 20 above the plurality of passages 56 and the

hollow shaft 20 above the perforations is closed, as shown at 57.

A plurality of vanes 60 are secured to the upper end 53 of the shaft 20 and also to the plate 55, and these vanes taper to points below openings 61 formed in the upper end 53 of the shaft 20. It will be noted more particularly from Figure 3 that these blades or vanes are curved for a purpose which will be presently explained. A spiral track 62 extends from the upper end of the conical shaped housing 50 to points adjacent the plate 55 and is secured to the inner wall of said housing. It will be noted that the inner edges of the track are spaced from the free edges of the vanes 60.

A discharge pipe 63 for oil is in open communication with the upper end 53 of the shaft 20 and this portion of the shaft is carried by the packing 22 which is located in a passage formed in the top plate 12.

The operation of my device is as follows:

The untreated oil from the well which contains water or the untreated oil from a container is forced through the bottom connection 70 of the hollow shaft 20 and the oil and water passes upwardly and is discharged through the openings 56 into the housing 50. The drum 23 is revolved likewise, causing rotation of the shaft 20 and the vanes or blades 60. The oil and water which has entered the housing 50 is agitated, and due to the rotation of the vanes 60 a centrifugal motion is imparted to the fluid in said housing. The heavier fluid, such as water, is thrown outwardly against the inner wall of the housing 50 while the oil, which is lighter, moves upwardly adjacent the upper end 53 of the shaft 20, where it enters the passages 61 in the shaft 20 and is discharged through the outlet pipe 63. The spiral path 62 being in the region where the water has been thrown by centrifugal force travels downwardly and is aided in its gravitational descent by the spiral path 62. The water enters a zone of rest which is located below the plate 55 and the bottom of the house whence the water passes downwardly through the space which is located between the tubular member 45 and the shaft 20, entering the receptacle 30 and is then discharged through the spout 31.

It will be noted that this method of separation of oil and water may be continuous as long as the constant stream of untreated oil is applied to the hollow shaft 20 through the connection 70. In view of this, water will flow continuously from the spout 31 while oil will be carried off through the outlet pipe 63.

I claim:

1. A separator comprising a housing, a hollow shaft extending through the housing and having its ends projecting from opposite ends of the housing, means for closing the hollow shaft between the opposite ends of the housing, one end of the shaft forming an outlet for oil, the other end of the shaft forming an inlet for crude oil containing water, the hollow shaft having intake ports at one side of the closing means to admit crude oil to the housing, the shaft having discharge ports for oil separated from the water on the opposite side of the closing means, means for rotating the shaft, vanes on the shaft and located in the housing for causing the heavier liquids to be thrown outwardly towards the walls of the housing, and means for withdrawing the heavier liquids away from the housing.

2. A separator comprising a housing, a hollow shaft extending through the housing and having its ends projecting from opposite ends of the housing, means for closing the hollow shaft between the opposite ends of the housing, one end of the shaft forming an outlet for oil, the other end of the shaft forming an inlet for crude oil containing water, the hollow shaft having intake ports at one side of the closing means to admit crude oil to the housing, the shaft having discharge ports for oil separated from the water on the opposite side of the closing means, means for rotating the shaft, vanes on the shaft and located in the housing for causing the heavier liquids to be thrown outwardly towards the walls of the housing, and means for withdrawing the heavier liquids away from the housing, a spirally arranged path on the inner wall of the housing for aiding in the gravital descent of the heavier liquids.

3. A separator comprising a housing, a hollow shaft extending through the housing and having its ends projecting from opposite ends of the housing, means for closing the hollow shaft between the opposite ends of the housing, one end of the shaft forming an outlet for oil, the other end of the shaft forming an inlet for crude oil containing water, the hollow shaft having intake ports at one side of the closing means to admit crude oil to the housing, the shaft having discharge ports for oil separated from the water on the opposite side of the closing means, means for rotating the shaft, vanes on the shaft and located in the housing for causing the heavier liquids to be thrown outwardly towards the walls of the housing, and means for withdrawing the heavier liquids away from the housing, a disk secured to the shaft above the intake ports to provide a zone of rest for the liquids located at the bottom of the housing.

4. A separator comprising a housing, a hollow shaft extending through the housing and having its ends projecting from opposite ends of the housing, means for closing the hollow shaft between the opposite ends of the housing, one end of the shaft forming an outlet for oil the other end of the shaft forming an inlet for crude oil containing water, the hollow shaft having intake ports at one side

of the closing means to admit crude oil to the housing, the shaft having discharge ports for oil separated from the water on the opposite side of the closing means, means for rotating the shaft, vanes on the shaft and located in the housing for causing the heavier liquids to be thrown outwardly towards the walls of the housing, and means for withdrawing the heavier liquids away from the housing, a disk secured to the shaft adjacent the lower ends of the vanes, and a spiral path in the inner wall of the housing.

5. A separator comprising a vertically disposed and conically shaped housing, a hollow shaft extending through the housing and having its ends projecting from opposite ends of the housing, means for closing the hollow shaft between the opposite ends of the housing, one end of the shaft forming an outlet for oil, the other end of the shaft forming an inlet for crude oil containing water, the hollow shaft having intake ports at one side of the closing means to admit crude oil to the housing, the shaft having discharge ports for oil separated from the water on the opposite side of the closing means, means for rotating the shaft, vanes on the shaft and located in the housing for causing the heavier liquids to be thrown outwardly towards the walls of the housing, and means for withdrawing the heavier liquids away from the housing, a spirally arranged path on the inner wall of the housing extending from the top of the housing to points adjacent the outlet connections between the shaft and the housing.

6. A separator comprising a vertically disposed and conically shaped housing, a hollow shaft extending through the housing and having its ends projecting from opposite ends of the housing, means for closing the hollow shaft between the opposite ends of the housing one end of the shaft forming an outlet for oil, the other end of the shaft forming an inlet for crude oil containing water, the hollow shaft having intake ports at one side of the closing means to admit crude oil to the housing, the shaft having discharge ports for oil separated from the water on the opposite side of the closing means, means for rotating the shaft, vanes on the shaft and located in the housing for causing the heavier liquids to be thrown outwardly towards the walls of the housing, means for withdrawing the heavier liquids away from the housing, a spirally arranged path on the inner wall of the housing extending from the top of the housing to points adjacent the outlet connections between the shaft and the housing, a disk secured to the shaft above said outlet connections to provide a zone of rest of the liquids between said disk and the bottom of the housing.

J. SHANNON ADAMS.