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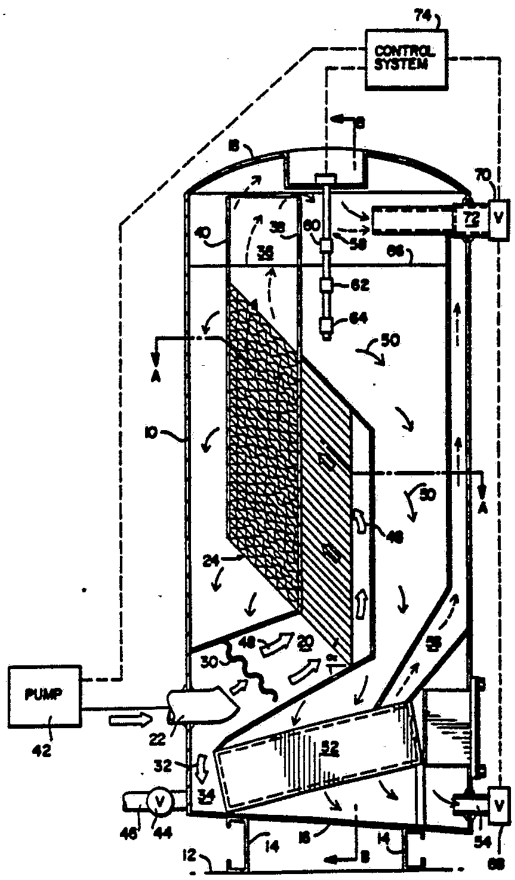
(54) Title: OIL-WATER SEPARATOR

(57) Abstract

An oil-water separator is disclosed having a vertical, cylindrical tank (10) with a plurality of corrugated, oleophilic plates (26). A corrugated diffusion baffle (30) is located adjacent an oil-water mixture inlet (22) to remove the larger particulate material from the mixture and to cause coalescing of the larger oil droplets. The flow of the oil-water mixture proceeds generally in a vertical direction and passes between the corrugated plates (26) to cause further coalescing of the oil droplets. A separate oil channel (36) directs the coslesced oil to an upper portion of the tank. The clarified water then passes downwardly to a clean water outlet (54). A second coalescing unit (52) may be located upstream of the clear water outlet to further coalesce and remove the smaller oil droplets. In this case, a second oil relief channel (56) directs these coalesced oil particles to the upper portion of the tank, from which the oil may be removed.



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AMENDED CLAIMS

[received by the International Bureau on 1st September 1988 (01.09.88); original claims 9, 17-21 cancelled , claims 1-8 amended; claims 10-12 renumbered as claims 9-11; claims 13-16 replaced by claim 12 (4 pages)]

1. (Amended) An oil-water separator including a tank (10), an inlet (22) located in a lower portion of the tank and defining a flow path to direct an oil-water mixture into the tank, a clean water outlet (54) from the tank, and an oil outlet (72) located in the upper portion of the tank to facilitate withdrawal of separated oil, characterized by: diffusion baffle means (30) in the inlet means, the diffusion baffle having a corrugated surface; a coalescing pack (24) comprising a plurality of substantially parallel generally planar oleophilic plates (26), each plate having a generally polygonal shape with a corner and being oriented such that first and second sides of each plate extending from the corner form acute angles with a generally horizontal plane passing through the corner, the plate pack located within the tank above the inlet means such that the oil-water mixture flows across the plates from the first side toward an opposite, third side through the plate pack between the corrugated plates causing the oil particles to separate from the water and to coalesce on the underside of the plates; a plurality of substantially parallel corrugations formed on major surfaces of each plate extending generally transverse to the flow of oil-water mixture across the plates such that oil particles coalescing on the underside of each plate are directed to a fourth side of each plate; means defining an oil relief channel (36) separated from the flow of water across the plate pack and in fluid communication with the fourth sides of the plate pack to direct the separated oil into an upper portion of the tank separate from the oil-water mixture flowing across the plates; and water channel means to direct water from the plate pack to the clean water outlet.

2. (Amended) The oil-water separation as claimed in Claim 1 characterized in that the tank has a generally cylindrical configuration oriented such that an axis of symmetry extends in a generally vertical direction.

3. (Amended) The oil water separator as claimed in Claim 1 or 2 characterized by a second coalescing unit (52) located within the tank in the water channel means upstream of the clean water outlet to coalesce oil droplets remaining in the water.

4. (Amended) The oil-water separator as claimed in claim 1, 2 or 3 characterized by means defining a second oil relief channel (56) separated from the water flow and in fluid communication with the second coalescing unit so as to direct oil removed by the second coalescing unit to an upper portion of the tank.

5. (Amended) The oil-water separator as claimed in any previous claim characterized in that the first side extends at an angle of approximately 16° and the second side extends at an angle of approximately 45° to the horizontal plane.

6. (Amended) The oil-water separator as claimed in any previous claim characterized in that each of the oleophilic plates has a substantially rhomboid shape.

7. (Amended) The oil-water separator as claimed in Claim 6 characterized in that the corrugations extend generally parallel to the first and third sides.

8. (Amended) The oil-water separator as claimed in any previous claim characterized in that each of the corrugations on the major surfaces of the oleophilic plates extend at an angle of between 65° and 70° to the direction of the oil-water flow over the plates.

9. (Deleted)

9. (Renumbered Claim 10) The oil-water separator as claimed in any previous claim, further including oil and water effluent valves (68,70); characterized by sensing means (58,60,62,64) to sense the level of the oil-water interface; and control means (74) interconnecting the sensing means with the oil effluent valve and the water effluent valve such that when the interface is above a predetermined level the water effluent valve is open and the oil effluent valve is closed; when the interface is between the first predetermined level and a lower, second predetermined level both oil and water effluent valves are open; and when the interface is below the second predetermined level, the oil effluent valve is open and the water effluent valve is closed.

10. (Renumbered Claim 11) The oil-water separator as claimed in Claim 9 characterized by control means (74) to close both the oil and water effluent valves when the oil-water interface reaches a third predetermined level below the second predetermined level.

11. (Renumbered Claim 12) The oil-water separator as claimed in Claim 10 characterized by pump means (42) to pump the oil-water mixture into the tank and wherein the control means also shuts off the pump means when the oil-water reaches the third predetermined level.

12. (Merged Claims 13,14,15,16) The oil-water separator as claimed in Claim 12 characterized in that the first side extends at an angle of approximately 45° and the second side extends at an angle of approximately 16° to the horizontal plane; each of the oleophilic plates has a substantially rhomboid shape; the corrugations extend generally parallel to the first and third sides; and each of the corrugations on the major surfaces of the oleophilic plates extend at an angle of between 65° and 70° to the direction of the oil-water flow over the plates.

13. (Deleted).

14. (Deleted).

15. (Deleted).

16. (Deleted).

17. (Deleted).

18. (Deleted).

19. (Deleted).

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