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A. W. KUZILIK

SEPARATOR

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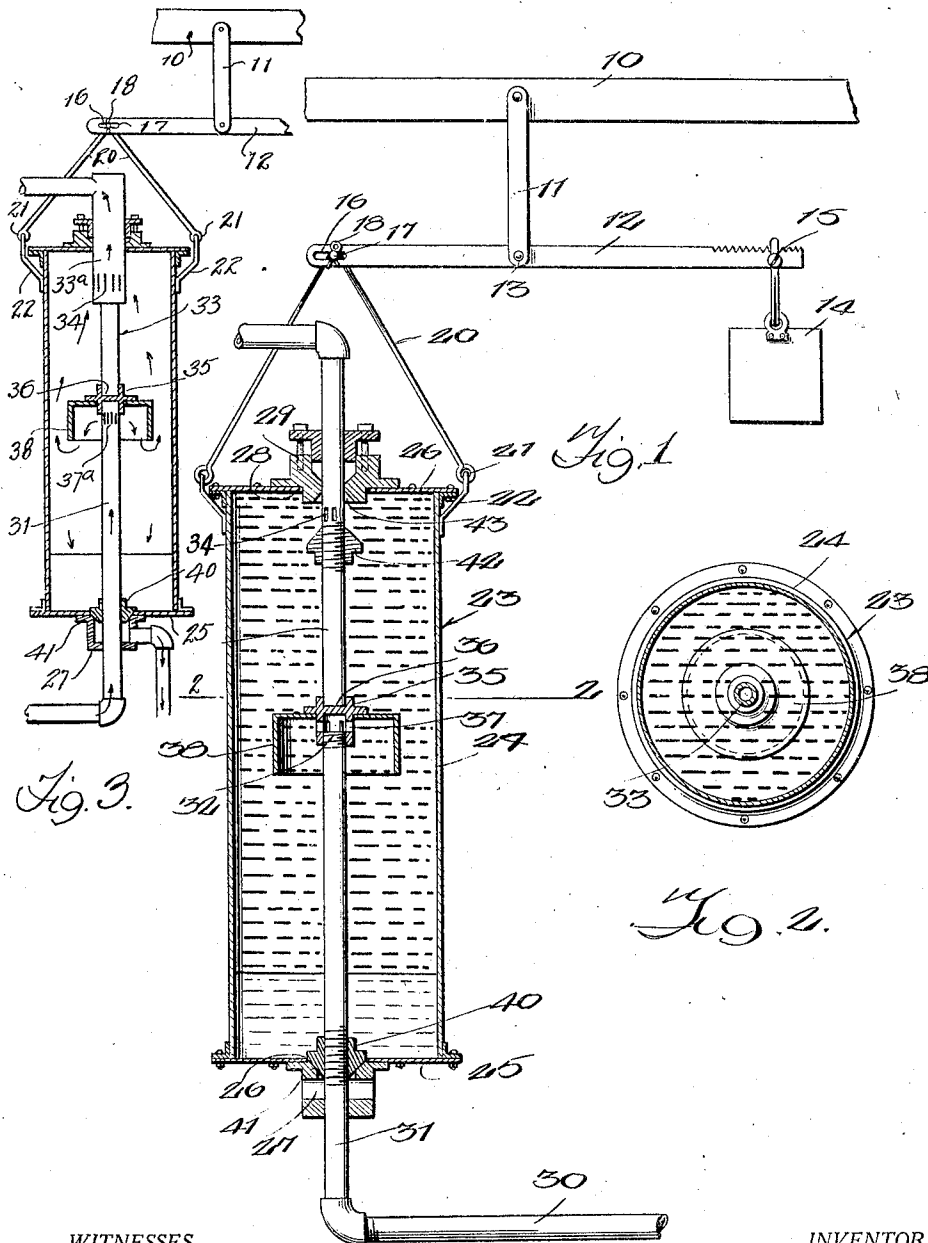


Fig. 3.

Fig. 2.

WITNESSES

George A. Murr
W. F. Buckley

INVENTOR

A. W. Kuzilik

BY

Murr & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

ANDREW WILLIAM KUZILIK, OF BARNSDALL, OKLAHOMA.

SEPARATOR.

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To all whom it may concern:

Be it known that I, ANDREW WILLIAM KUZILIK, a citizen of the United States, and a resident of Barnsdall, in the county of Osage and State of Oklahoma, have invented certain new and useful Improvements in Separators, of which the following is a specification.

This invention relates to an improvement in separators especially adapted for use in separating water from oil although also adapted for separating other fluids such as water from steam or the like.

The object of the invention is to provide a separator of this character which will automatically separate the water from the oil or steam in an efficient and novel manner and without the employment of any power means or expensive or complicated apparatus.

Another object is to provide a device of this character and having these advantages which is simple and durable in construction, reliable, safe and automatic in operation, and easy and comparatively inexpensive to manufacture and install.

Other objects and advantages of the invention reside in certain novel features of the construction, combination and arrangement of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawings forming part of this specification, and in which:

Figure 1 is a view, partly in section and partly in elevation, illustrating the preferred embodiment of the invention;

Figure 2 is a view thereof on line 2—2 of Figure 1; and

Figure 3 is a fragmentary view, partly in central vertical section and partly in elevation illustrating a slightly modified form of the invention.

Referring to the drawings wherein for the sake of illustration is shown the preferred embodiment of the invention, the numeral 10 designates a suitable support from which a hanger 11 depends. A balance beam 12 is fulcrumed, as at 13, on the hanger 11 and has a weight 14 adjustably supported adjacent one end, as indicated at 15. The opposite end of the balance beam 12 is slotted, as at 16, and by means of a pivot 17 slidably mounted in the slot but held against endwise displacement by cotter pins 18 is

pivotaly connected to eyes or other suitable devices provided at the upper ends of connecting rods 20, the lower ends of which are formed with eyes 21 interengaged with attaching lugs 22 secured to the upper end of the settling tank designated generally at 23.

The settling tank 23 comprises a cylindrical drum 24 arranged with its longitudinal axis vertical and having its lower end closed by a head 25 and its upper end closed by a head 26. The head 25 is provided with a central discharge port 26 which communicates with the ports of a discharge fitting 27. The head 28 is also provided with a central opening 28 equipped with a stuffing box or packing gland 29. The pipe line which conveys the oil or steam having the water commingled therewith to the settling tank 23 is designated at 30 and has incorporated therein a vertically disposed inlet pipe 31 which extends up through a discharge fitting 27 and through the discharge port 26 and which terminates in an open end 32 at about the center of the tank. An outlet pipe 33 is also embodied in the pipe line and is arranged in vertical alinement with the pipe 31. This outlet pipe extends through the stuffing box or packing gland 29 and at a point just below the packing gland 29 and within the tank 23 it is provided with one or more outlet ports 34 affording communication between the interior of the tank and the outlet pipe when the parts are positioned as shown in Figure 1. A coupling 35 serves to rigidly connect the pipes 31 and 33 and is provided with a partition or division wall 36 which separates the pipes 31 and 32 and prevents direct communication between these pipes. The partition 35 is arranged a slight distance above the open end of the pipe 31 and the tubular portion of the coupling between this open end and the partition 36 is provided with a plurality of ports or openings 37 permitting of flow of the oil and water or steam and water from the pipe into the tank 23. An inverted cup-shaped baffle 38 is carried by the coupling 35 and extends above and around the openings 37 and serves to deflect the incoming oil and water or steam or water downwardly into the tank 23. A discharge valve 40 is fixed to the inlet pipe 31 and cooperates with a valve seat 41 provided therefor in the discharge fitting 27. An outlet valve 42 is fixed to the

outlet pipe 33 just below the ports 34 and is cooperable with a valve seat 43 provided on the stuffing box 29.

When the separator is used for separating water from oil the weight 14 is adjusted on the balance beam 12 to support the tank in its uppermost position, as shown in Figure 1, when the same contains about a foot of water, as indicated in Figure 1, and is filled above the water with oil. At this point it is to be understood that suitable supports are provided for the pipe line so as to hold the pipes 31 and 33 stationary and rigid. When the oil having water commingled therewith flows in through the pipe 31 it passes through the open end thereof, through the openings 37 and is deflected by the baffle 38 downwardly into the tank 23. This insures precipitation or settling of the water in the bottom of the tank leaving the oil alone free to flow upwardly in the tank to the outlet ports 34. The oil from which the water has been removed flows through the ports 34 into the outlet pipe 33 and on to the point to which it is to be delivered or stored. When the water accumulating in the bottom of the tank exceeds a predetermined weight it will cause the tank to move or slide downwardly on the pipes 31 and 33 against lifting action of the weight 15. This movement of the tank will cause the valve seat 41 to move away from the discharge valve 40 and will permit water at the bottom of the tank to flow out through the port 26 and the ports in the discharge fittings 27. At the same time the valve 42 has been brought against the seat 43 and the ports 34 are disposed in the bore or opening of the stuffing box 29. The fact that the ports 34 are moved into the opening of the stuffing box might alone be sufficient to prevent outflow of oil during the water discharging operation but this action is rendered sure and more positive by the provision of the valve 42. It will be understood that by preventing outflow of oil during the water discharging operation a complete separation of the oil from the water is insured at all times. As soon as the amount of water in the lower end of the tank 23 has been reduced to a predetermined point the weight 14 is again effective to lift or slide the tank upwardly relative to the pipes 31 and 33 to close the discharge valve and open the outlet valve so that the separating action above described may be continued. This operation is automatic and continuous and requires no attention.

The separator is also adapted for separating water from steam but when so used it will usually be found desirable to omit the valve 42 and to place the ports 34 lower down on the pipe 33 so that the steam may be discharged from the tank at all times, it being undesirable to permit steam pressure

to build up in the tank. As shown in Figure 3 the separator when adapted for use in separating water from steam is identical with the arrangement shown in Figure 1 and the description hereinabove applied thereto except that the upper part of the pipe 33 is enlarged, as at 33^a and has the ports 34 formed therein as shown, and that the pipe 31 has its upper end abutting the partition 36 of the coupling 35 and is formed with ports 37^a. When the device is used for separating water of condensation from steam the commingled water and steam flow into the tank from the pipe 30 and are deflected downwardly by the baffle 38 to insure precipitation of the water, after which the steam passes upwardly and out through the port of the outlet pipe. When the water accumulating in the tank exceeds a predetermined amount it will automatically lower the tank to permit of the escape of the water to reduce the quantity thereof to a predetermined amount after which the tank is automatically moved upwardly to close the discharge valve.

I claim:

1. A separator comprising a settling tank having a water discharge port in its lower end and having an outlet in the upper part of the tank, means for supporting the tank and adapted to permit of downward movement of the tank when the weight of the liquid in the tank exceeds a predetermined amount, a stationary discharge valve cooperable with the discharge port and arranged to be opened when the tank moves downwardly and to be closed when the tank is supported in its uppermost position, and an outlet valve cooperable with said outlet and arranged to be closed when the tank moves downwardly and to be opened when the same is in its uppermost position.

2. A separator comprising a settling tank having a water discharge port in its lower end, a stationary inlet pipe extending into the tank through the discharge port and opening into the tank intermediate the ends thereof, a stationary outlet pipe leading through the upper end of the tank and having an outlet port leading thereinto, a coupling between the inlet pipe and the outlet pipe and having a partition separating the said pipes, a baffle carried by the coupling and designed to deflect the fluids from the inlet pipe downwardly in the tank, a discharge valve fixed to the inlet pipe and cooperable with the discharge port, and means for supporting the tank and adapted to permit of downward movement of the tank relative to said pipes when the weight of the fluid in the tank exceeds a predetermined amount.

3. A separator comprising a settling tank having a water discharge port in its lower end, a stationary inlet pipe extending into

the tank through the discharge port and opening into the tank intermediate the ends thereof, a stationary outlet pipe leading through the upper end of the tank and having an outlet port leading thereinto, a coupling between the inlet pipe and the outlet pipe and having a partition separating the said pipes, a discharge valve fixed to the inlet pipe and cooperable with the discharge port, and means for supporting the tank and adapted to permit of downward movement of the tank relative to said pipes when the weight of the fluid in the tank exceeds a predetermined amount.

4. A separator comprising a settling tank having a water discharge port in its lower end, a stationary inlet pipe extending into the tank through the discharge port and opening into the tank intermediate the ends thereof, a stationary outlet pipe leading through the upper end of the tank and having an outlet port leading thereinto, a coupling between the inlet pipe and the outlet pipe and having a partition separating the said pipes, a baffle carried by the coupling and designed to deflect the fluids from the inlet pipe downwardly in the tank, a discharge valve fixed to the inlet pipe and cooperable with the discharge port, an outlet valve carried by the outlet pipe adjacent the outlet port and cooperable with the tank for shutting off communication between the

tank and the outlet port, and means for supporting the tank and adapted to permit of downward movement of the tank relative to said pipes when the weight of the fluid in the tank exceeds a predetermined amount and comprising a hanger, a balance beam fulcrumed thereon, a weight at one end of said beam, and connections between the opposite ends of said beam and said tank.

5. A separator comprising a settling tank having a water discharge port in its lower end, a stationary inlet pipe extending into the tank through the discharge port and opening into the tank intermediate the ends thereof, a stationary outlet pipe leading through the upper end of the tank and having an outlet port leading thereto, a discharge valve fixed to the inlet pipe and cooperable with the discharge port, an outlet valve carried by the outlet pipe adjacent the outlet port and cooperable with the tank for shutting off communication between the tank and the outlet port, and means for supporting the tank and adapted to permit of downward movement of the tank relative to said pipes when the weight of the fluid in the tank exceeds a predetermined amount and comprising a hanger, a balance beam fulcrumed thereon, a weight at one end of said beam, and connections between the opposite ends of said beam and said tank.

ANDREW WILLIAM KUZILIK.