March 4, 1969 S. A. KIRK ET AL 3,430,853

TURBINE CENTRIFUGE

Filed Oct. 7, 1966

FIG. 1

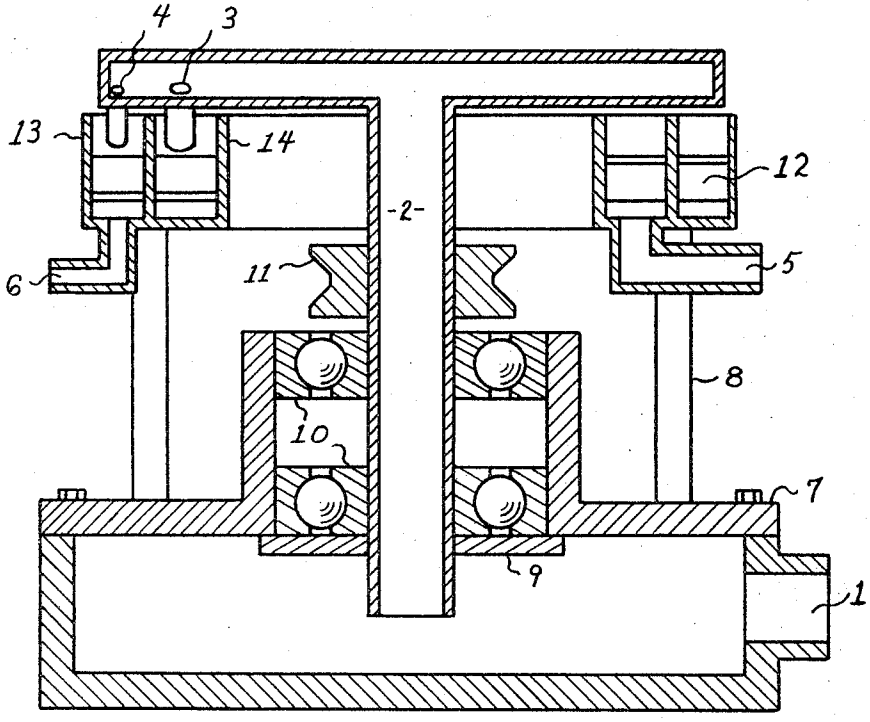
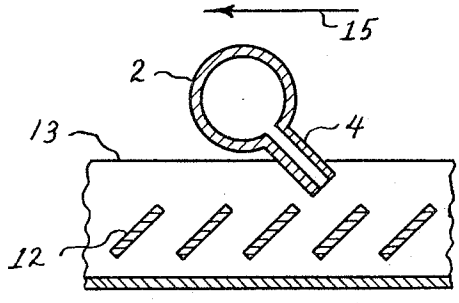


FIG. 2



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TURBINE CENTRIFUGE

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ABSTRACT OF THE DISCLOSURE

The Turbine Centrifuge is a device in the form of a tubular centrifuge with the objective of separating liquids of different weights contained in a solution or mixture. Removal ports, or holes in the tube into liquid layers when the tube and mixture are under centrifugal force, eject the separated liquids to form a reaction wheel with the objective of device efficiency.

The present invention relates to improvement in centrifuge type devices used in separating compounds contained in a solution.

It is an objective of the present invention to provide a device capable of economically removing the salt from sea water, but by no means is this invention limited to this application.

FIGURE 1 is a cut-away view of the device.

FIGURE 2 is an end cut-away view of one of the centrifuge tubes, a turbine nozzle, the jet stream striker plates and a section of the salt solution removal trough.

On drawing **1** is the salt water intake port; on drawing **2** the shaft of the centrifugal pump; drawing **3** the fresh water ejection turbine nozzle or exit; drawing **4** the salt solution ejection nozzle or exit; the nozzles or exits being connected to a tube or pocket communicating with the shaft; drawing **5** the fresh water outlet; drawing **6** the salt water outlet; drawing **7** the device housing; drawing **8** the trough support frame; drawing **9** a water seal; drawing **10** the pump bearings; drawing **11** the pump drive; drawing **12** the salt water jet stream striker plates; drawing **13** the salt water removal trough; drawing **14** the fresh water removal trough and drawing **15** is an arrow indicating the direction of centrifuge rotation.

The device makes use of centrifugal force and the fact that sodium has an atomic weight of 22.997, chlorine has an atomic weight of 35.457, oxygen has an atomic weight of 16 and hydrogen has an atomic weight of 1.0081.

This device can be driven as a turbine by hydraulic water pressure injected at point **1**.

As represented, **11**, the drive pulley drives a centrifugal pump, **2**. Centrifugal force throws the salt to the ends of the centrifuge tubes. Static pressure build up from the centrifugal force ejects a jet stream of salt water from turbine nozzle **4**, and the lighter fresh water is ejected from nozzle **3**. The jet stream striking the striker plates **12** transfers the energy back to the rotating pump **2**. Salt water is removed at point **6** and fresh water at point **5**.

The centrifuge tubes must be larger than the combined output of the turbine nozzles to allow centrifugal force to separate the salt from the fresh water.

Percentage of salt solution to fresh water separation is determined by the ratio of the size of the turbine nozzles and their positions on the centrifuge tubes.

The amount of energy needed to drive this device is determined by the friction loss of the pump bearings and the turbine efficiency.

We claim as our invention:

1. A centrifuge comprising a tubular shaft mounted for rotation about the axis thereof, at least one pocket extending generally radially from the shaft for rotation therewith, at least two exits extending from the pocket at different radial distances from the axis, at least one of the exits being angled rearwardly from the pocket oppositely from the direction of rotation to form a reaction drive, individual troughs situated to receive the separated discharges, the shaft having means to supply the shaft with a substance under pressure to be separated, the shaft and the pocket providing a substantially closed path from the means to the exits.

2. The centrifuge of claim **1** with striker plates provided in the trough for the one exit to augment the reaction.

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