



(11) (21) (C) **2,028,127**
(86) 1990/03/06
(87) 1990/09/08
(45) 2000/01/04

(72) Copeland, James C., US

(72) Adler, Howard I., US

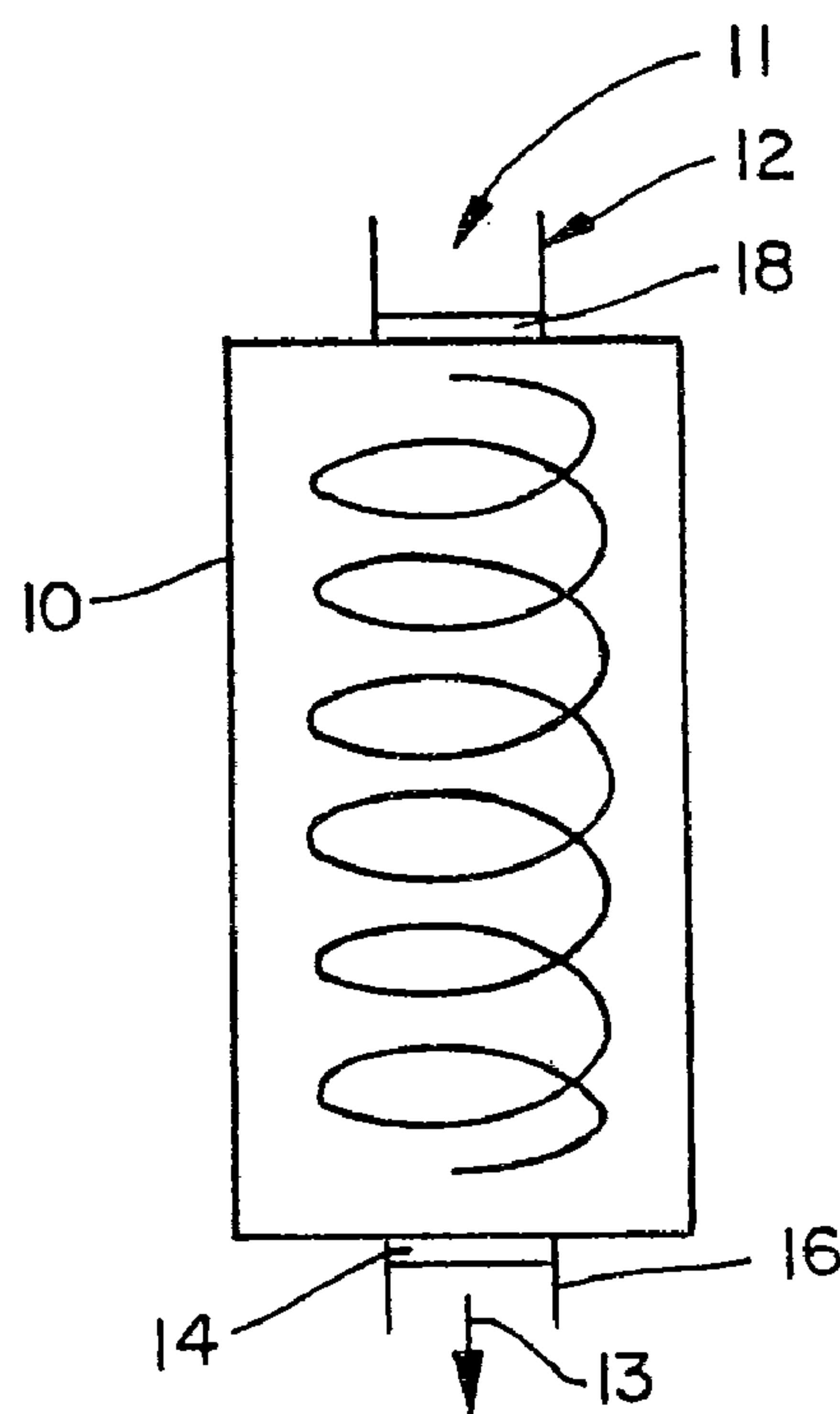
(73) OXYRASE, INC., US

(51) Int.Cl.⁶ C02F 3/00, C02F 3/34

(30) 1989/03/07 (319,748) US

(54) **METHODE D'EXTRACTION CONTINUE DE L'OXYGENE
CONTENU DANS DES FLUIDES EN MOUVEMENT, ET
APPAREIL CONNEXE**

(54) **APPARATUS AND METHOD FOR CONTINUOUSLY
REMOVING OXYGEN FROM FLUID STREAMS**



(57) The present invention is directed to a continuous flow method for removing oxygen from a fluid stream. The method comprises the steps of providing a fluid stream containing oxygen, causing the fluid stream to come in contact directly or indirectly, with a sufficient amount of oxygen scavenging cell membrane fragments having an electron transport system which reduces oxygen to water to catalyze the transformation of the oxygen contained in the fluid stream to water. The present invention is also directed to an apparatus for removing oxygen from a fluid stream. The apparatus is comprised of a flow through reactor column (10) containing a sufficient amount of oxygen scavenging cell membrane fragments having an electron transport system which reduces oxygen to water to catalyze the transformation of oxygen present in a fluid stream to water, wherein said fragments are contained therein by plugs (14, 18) which allow free contact between said fragments and the fluid stream flowing therethrough.

2028127

-1-

APPARATUS AND METHOD FOR CONTINUOUSLY REMOVING
OXYGEN FROM FLUID STREAMSBackground of the Invention

5 The present invention relates to an apparatus and method for removing dissolved oxygen from aqueous fluids on a continuous basis.

10 It is well known that the presence of oxygen in continuous fluid processes, as well as the products produced thereby, can cause a great deal of detrimental damage. For example, beverages and food products produced by on-line bottling or canning processes, such as fruit juices, soft drinks, beer, wine, milk, soups, vegetable juices, and pastes, etc. may be unstable over even a relatively short period of time due to undesirable changes produced by oxidative deterioration. In this regard, among
15 the oxidative changes which beverages and food products incur over time include changes in color, consistency, and flavor. Since these changes in the beverages and food products greatly decrease the product's marketability, it is desirable to reduce the presence of oxygen in the
20 overall product.

25 Furthermore, if oxygen is present in the beverage and/or food product during bottling or canning, the oxygen included in the product can also cause deterioration of the container's plastic or metal lining, packaging, etc. Thus, in modern beverage and food product preparation systems, it is desirable to remove the extraneous oxygen from the fluids to greatly increase the shelf life of the packaged product prior to and/or during on-line processing.

30 This is particularly important in modern brewing operations, wherein the feed stock must be almost completely deoxygenated in that the presence of even a

