AIR SEPARATION METHOD AND APPARATUS TO PRODUCE NITROGEN

ABSTRACT

An air separation method and apparatus for producing nitrogen is provided in which oxygen enriched liquid, produced as a column bottoms of a distillation column, is partially vaporized and phase separated. The vapor phase is expanded to provide refrigeration while the liquid phase, after pressure reduction, is introduced into the head condenser to condense reflux to the column. Alternatively, part of the oxygen enriched liquid can be fully vaporized and then expanded to provide refrigeration. In such case, another part of the oxygen enriched liquid can be used to condense reflux to the column. Part of the air to be separated is liquefied against the oxygen enriched liquid to be vaporized and then introduced into a lower portion of the column to maintain production and purity levels that would have been obtained had all the oxygen enriched liquid stream been used in condensing reflux to the column.

Fig. 1