

## Title (en)

DEVICE AND METHOD FOR LIQUEFYING A FLUID SUCH AS HYDROGEN AND/OR HELIUM

## Title (de)

VORRICHTUNG UND VERFAHREN ZUR VERFLÜSSIGUNG EINES FLUIDS WIE WASSERSTOFF UND/ODER HELIUM

## Title (fr)

DISPOSITIF ET PROCÉDÉ DE LIQUÉFACTION D'UN FLUIDE TEL QUE L'HYDROGÈNE ET/OU DE L'HÉLIUM

## Publication

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## Application

**EP 22700818 A 20220118**

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## Abstract (en)

[origin: WO2022171391A1] Disclosed is a device for liquefying a fluid, comprising a fluid circuit (3) to be cooled, the device (1) comprising a heat exchanger assembly (6, 7, 8, 9, 10, 11, 12, 13) in heat exchange with the fluid circuit (3) to be cooled, at least one first cooling system (20) in heat exchange with at least a portion of the heat exchanger assembly (6, 7, 8, 9, 10, 11, 12, 13), the first cooling system (20) being a refrigerator having a cycle for refrigerating a cycle gas mainly comprising helium, said refrigerator (20) comprising in series in a cycle circuit (14): a mechanism (15) for compressing the cycle gas, at least one member (16, 5, 6, 8, 10, 12) for cooling the cycle gas, a mechanism (17) for expanding the cycle gas, and at least one member (13, 12, 11, 10, 9, 8, 7, 6, 5) for reheating the expanded cycle gas, wherein the compression mechanism includes at least four compression stages (15) in series composed of a centrifugal compressor assembly (15), the compression stages (15) being mounted on shafts (19, 190) that are rotationally driven by a motor assembly (18), the expansion mechanism comprising at least three expansion stages in series composed of a set of centripetal turbines (17), the at least one member (16, 5, 6, 8, 10, 12) for cooling the cycle gas being configured to cool the cycle gas at the outlet of at least one of the turbines (17), and wherein at least one of the turbines (17) is coupled to the same shaft (19) as at least one compression stage (15) so as to feed the mechanical work produced during the expansion to the compression stage (15).

## IPC 8 full level

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