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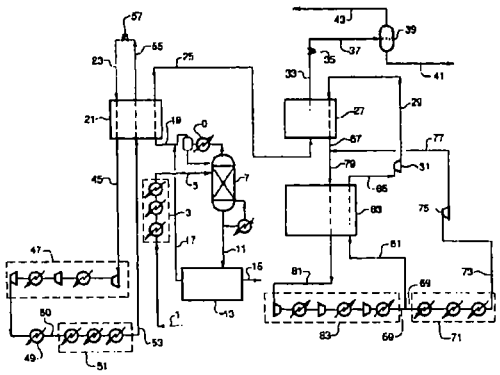
(54) **Title:** HYBRID GAS LIQUEFACTION CYCLE WITH MULTIPLE EXPANDERS



(57) **Abstract:** Gas is liquefied by a method comprising cooling a feed gas (1) by a first refrigeration system (45, 47, 49, 51, 53, 21, 55, 57, 23, 21) in a first heat exchange zone (21) and withdrawing a substantially liquefied feed stream (25) therefrom, further cooling the substantially liquefied feed stream in a second heat exchange zone (27) by indirect heat exchange with one or more work-expanded refrigerant streams (29) provided by a second refrigeration system (81, 83, 59, (i) 61, 63, 65, 31, 29, 27, 67 & (ii) 69, 71, 73, 75, 77, & 79, 63), and withdrawing therefrom a further cooled, substantially liquefied feed stream (33). At least one (29) of the one or more work-expanded refrigerant streams is provided by compressing (83) one or more refrigerant gases (81) to provide a compressed refrigerant stream (59), cooling all or a portion (61) of the compressed refrigerant stream (59) in a third heat exchange zone (63) to provide a cooled, compressed refrigerant stream (65), and work expanding (31) the cooled, compressed refrigerant stream (65) to provide one of the one or more work-expanded refrigerant streams (29). The flow rate of a work-expanded refrigerant stream (29) in the second heat exchange zone (27) is less than the total flow rate of one or more work-expanded refrigerant streams (67 + 77 = 79) in the third heat exchange zone (63) or additional refrigeration duty is provided to the third heat exchange zone by a third refrigeration system (Fig. 9; 911, 913, 905, 903, 907, 909, 903).

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