CLAIMS

1. A branch-off unit that is provided to a liquid-side connection pipe (20) and a gas-side connection pipe (25) via which a heat-source unit (11) of a refrigeration apparatus (10) is connected to utilization-side units (12a to 12f), comprising:

a liquid-side header (50) provided to the liquid-side connection pipe (20), the liquid-side header (50) including a single liquid-side collecting port (52) for connection with a pipe (21) extending to the heat-source unit (11) and liquid-side branch-off ports (54a to 54f) for connection with pipes (22a to 22f) extending to the utilization-side units (12a to 12f), the single liquid-side collecting port (52) communicating with all of the liquid-side branch-off ports (54a to 54f);

a gas-side header (60) provided to the gas-side connection pipe (25), the gas-side header (60) including a single gas-side collecting port (62) for connection with a pipe (26) extending to the heat-source unit (11) and gas-side branch-off ports (64a to 64f) for connection with pipes (27a to 27f) extending to the utilization-side units (12a to 12f), the single gas-side collecting port (62) communicating with all of the gas-side branch-off ports (64a to 64f); and

a casing (40) in which the liquid-side header (50) and the gas-side header (60) are stored, wherein the branch-off unit and the utilization-side units (12a to 12f) are installed indoors.

2. The branch-off unit according to claim 1, wherein the liquid-side collecting port (52) and the gas-side collecting port (62) are exposed to an outside of the casing (40) through a first side face (41) of the casing (40).

3. The branch-off unit according to claim 2, wherein all of the liquid-side branch-off ports (54a to 54f) and all of the gas-side branch-off ports (64a to 64f) are exposed to the outside of the casing (40) through a second side face (42) of the casing (40).

4. The branch-off unit according to claim 3, wherein, of the liquid-side branch-off ports (54a to 54f) and the gas-side branch-off ports (64a to 64f), a liquid-side branch-off port and a gas-side branch-off port that are paired and connected to a certain one of the utilization-side units (12a to 12f) are aligned in a top-bottom direction.

5. The branch-off unit according to any one of claims 1 to 4, wherein

~~the liquid-side header (50) includes a liquid-side collecting pipe (51) having a first end being closed and a second end functioning as the liquid-side collecting port (52) and liquid-side branch-off pipes (53a to 53f) protruding laterally from the liquid-side collecting pipe (51) and having tip ends functioning as the liquid-side branch-off ports (54a to 54f), the liquid-side branch-off pipes (53a to 53f) being arranged at a certain interval along an axial direction of the liquid-side collecting pipe (51), and~~

~~the gas-side header (60) includes a gas-side collecting pipe (61) having a first end being closed and a second end functioning as the gas-side collecting port (62) and gas-side branch-off pipes (63a to 63f) protruding laterally from the gas-side collecting pipe (61) and having tip ends functioning as the gas-side branch-off ports (64a to 64f), the gas-side branch-off pipes (63a to 63f) being arranged at a certain interval along an axial direction of the gas-side collecting pipe (61).~~

~~6. The branch-off unit according to claim 5, wherein~~

~~the liquid-side branch-off pipes (53a to 53f) of the liquid-side header (50) include liquid-side branch-off pipes having different diameters and larger-diameter ones (53a, 53b) of the liquid-side branch-off pipes are disposed closer to the liquid-side collecting port (52), and~~

~~the gas-side branch-off pipes (63a to 63f) of the gas-side header (60) include gas-side branch-off pipes having different diameters and larger-diameter ones (63a, 63b) of the gas-side branch-off pipes are disposed closer to the gas-side collecting port (62).~~

~~7. The branch-off unit according to any one of claims 1 to 6, wherein~~

~~the liquid-side header (50) includes a single mechanical pipe joint (56) for mechanically connecting the pipe (21) to the liquid-side collecting port (52) and a plurality of flared pipe joints (57) for connecting the pipes (22a to 22f) to the liquid-side branch-off ports (54a to 54f), and~~

~~the gas-side header (60) includes a single mechanical pipe joint (66) for mechanically connecting the pipe (26) to the gas-side collecting port (62) and a plurality of flared pipe joints (67) for connecting the pipes (27a to 27f) to the gas-side branch-off ports (64a to 64f).~~

~~8. The branch-off unit according to any one of claims 1 to 7, wherein the casing (40) includes a coupling portion (44) that is designed to be coupled to a support member (96) fixed to a building (90) to hang the casing (40) at the support member (96).~~

~~9. A refrigeration apparatus comprising:~~

~~a branch-off unit (13) according to any one of claims 1 to 8;~~

~~a heat source unit (11) installed outdoors and connected to the branch-off unit (13); and~~

~~utilization-side units (12a to 12f) installed indoors and connected to the branch-off unit (13).~~

~~10~~1. A method for installing a refrigeration apparatus (10) to a building (90), the refrigeration apparatus (10) including a heat source unit (11), utilization-side units (12a to 12f), and a branch-off unit (13) that is provided to a liquid-side connection pipe (20) and a gas-side connection pipe (25) via which the heat source unit (11) is connected to the utilization-side units (12a to 12f),

the branch-off unit (13) including

a liquid-side header (50) provided to the liquid-side connection pipe (20), the liquid-side header (50) including a single liquid-side collecting port (52) for connection with a pipe (21) extending to the heat source unit (11) and liquid-side branch-off ports (54a to 54f) for connection with pipes (22a to 22f) extending to the utilization-side units (12a to 12f), the single liquid-side collecting port (52) communicating with all of the liquid-side branch-off ports (54a to 54f),

a gas-side header (60) provided to the gas-side connection pipe (25), the gas-side header (60) including a single gas-side collecting port (62) for connection with a pipe (26) extending to the heat source unit (11) and gas-side branch-off ports (64a to 64f) for connection with pipes (27a to 27f) extending to the utilization-side units (12a to 12f), the single gas-side collecting port (62) communicating with all of the gas-side branch-off ports (64a to 64f), and

a casing (40) in which the liquid-side header (50) and the gas-side header (60) are stored, the method comprising:

an installation step of installing the heat source unit (11) outside the building (90) and installing the utilization-side units (12a to 12f) and the branch-off unit (13) inside the building (90);

a first connecting step of connecting the heat source unit (11) and the branch-off unit (13) to each other via a liquid-side trunk pipe (21) and a gas-side trunk pipe (26), the liquid-side trunk pipe (21) being made of a plurality of pipe members (31) connected to each other via a mechanical pipe joint (33), the gas-side trunk pipe (26) being made of a plurality of pipe members (32) connected to each other via a mechanical pipe joint (34); and

a second connecting step of connecting the utilization-side units (12a to 12f) and the branch-off unit (13) to each other via liquid-side branch pipes (22a to 22f) and gas-side branch pipes (27a to 27f), each of the liquid-side branch pipes (22a to 22f) and the gas-side

branch pipes (27a to 27f) being made of seamless pipes.

~~11~~2. The method according to claim ~~10~~1, further comprising a branch pipe manufacturing step of manufacturing the liquid-side branch pipes (22a to 22f) and the gas-side branch pipes (27a to 27f) by cutting, on a site where the refrigeration apparatus (10) is to be installed, a long copper pipe carried to the ~~building (90)~~site in a form of a coiled package, each of the liquid-side branch pipes (22a to 22f) and the gas-side branch pipes (27a to 27f) being made of seamless pipes, wherein

in the second connecting step, the utilization-side units (12a to 12f) and the branch-off unit (13) are connected to each other via the liquid-side branch pipes (22a to 22f) and the gas-side branch pipes (27a to 27f) manufactured in the branch pipe manufacturing step.

~~12~~3. The method according to claim ~~10~~1 or ~~11~~2, wherein

the branch-off unit (13) is configured such that the liquid-side branch-off ports (54a to 54f) and the gas-side branch-off ports (64a to 64f) are respectively provided with flared pipe joints (57, 67), and

in the second connecting step, the liquid-side branch pipes (22a to 22f) are connected to the liquid-side branch-off ports (54a to 54f) via the flared pipe joints (57), respectively, and the gas-side branch pipes (27a to 27f) are connected to the gas-side branch-off ports (64a to 64f) via the flared pipe joints (67), respectively.

~~13~~4. The method according to any one of claims ~~10~~1 to ~~12~~3, wherein the pipe members (31, 32), which constitute the liquid-side trunk pipe (21) and the gas-side trunk pipe (26) used in the first connecting step, are made by braze-bonding of a plurality of parts, and the pipe members (31, 32) manufactured in a factory or a workshop ~~thus made~~ are carried into the building (90) where the refrigeration apparatus (10) is to be installed.