

Sept. 14, 1965

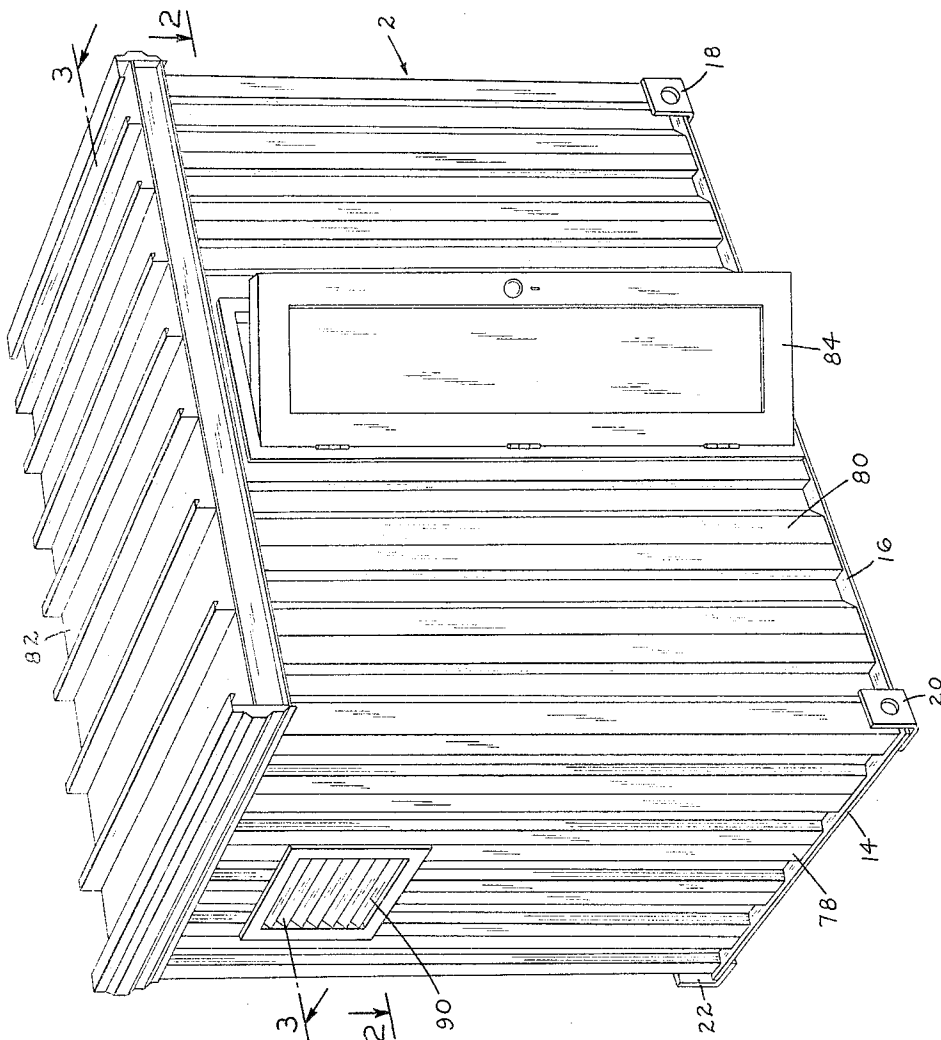
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3,205,674

UNITIZED REFRIGERATION STATION

Filed Feb. 1, 1963

3 Sheets-Sheet 1



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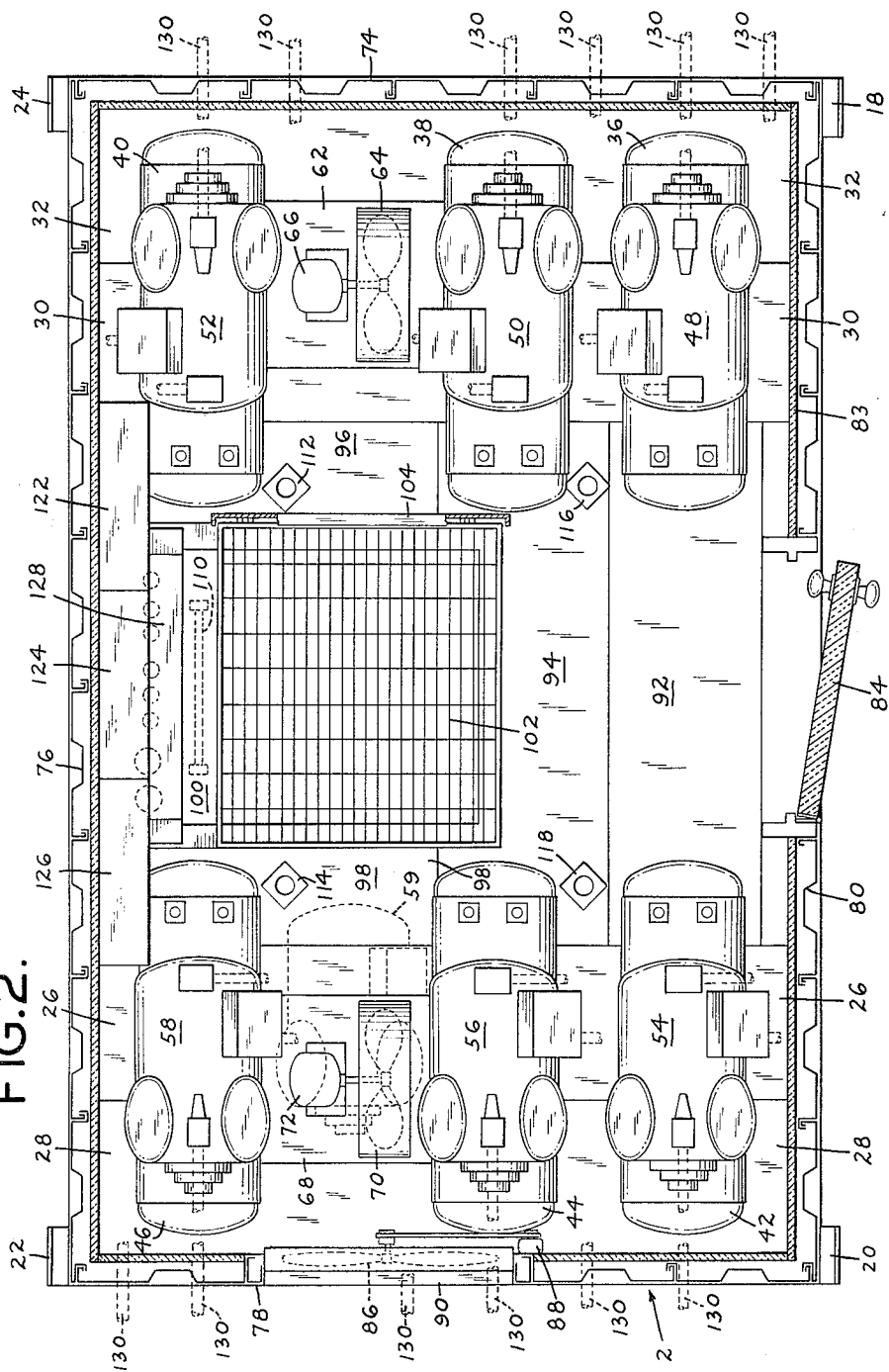
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UNITIZED REFRIGERATION STATION

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FIG. 2.



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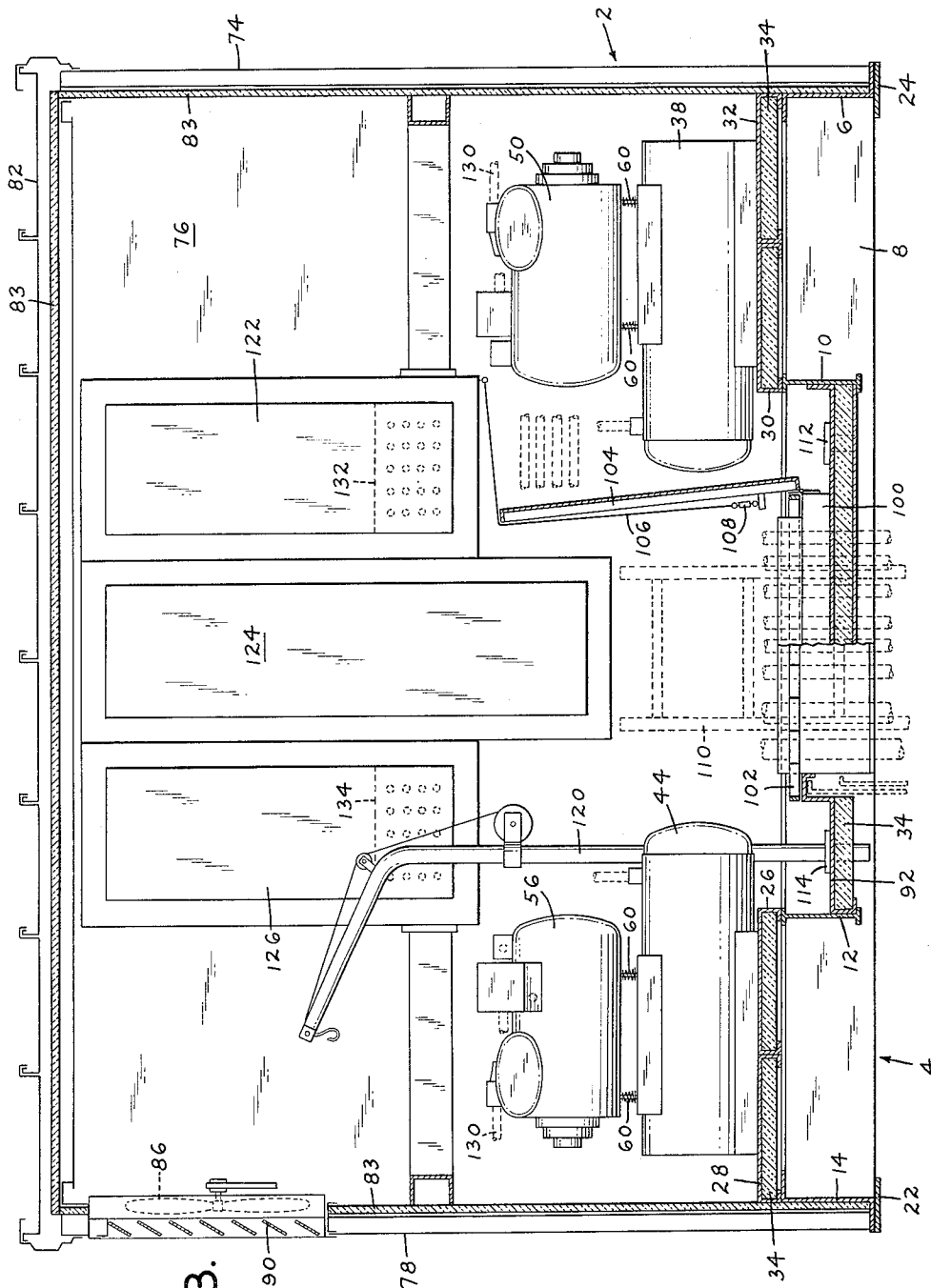


FIG. 3.

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UNITIZED REFRIGERATION STATION

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3 Claims. (Cl. 62—180)

This invention relates to refrigeration equipment and more particularly relates to a unitized refrigeration station.

With the growth of supermarkets and with the popularity of frozen foods, the modern food store must have adequate capacity for maintaining temperature in both commercial and low temperature fixtures. It is frequently the practice in filling the need for refrigeration capacity to establish a machinery room set off in a portion of the floor area of the store itself. All of the equipment must be brought to this room as separate units which then must be mounted and hooked up, requiring a great deal of on-site installation work by highly skilled workmen. This area is necessarily relatively far removed from the refrigerant consuming display cases, etc. Moreover, the area used for refrigeration equipment is lost for other purposes and so increases the cost of construction and operation of the store. Frequently the machinery room is larger and more complicated than necessary because of the need for high volume air handling equipment and the use of multiple small refrigeration units.

It is an object of this invention to provide a unitized refrigeration station which is economical in installation cost, in floor space requirements and in operation, and which is easy to service and maintain.

It is a further object of this invention to provide an all weather, unitized refrigeration station which may be roof mounted and which contains all necessary refrigeration compressors, receivers, associated equipment and controls, electrical wiring and piping for use in a large food store, with all of the components factory mounted, hooked up and tested, whereby a minimum of installation hours are required.

Other objects will be apparent to those skilled in the art from reading the following specification taken in conjunction with the drawings, in which:

FIG. 1 is a perspective view of the exterior of the unitized refrigeration station of this invention;

FIG. 2 is a plan view of the interior of the unitized refrigeration station taken generally along line 2—2 of FIGURE 1; and

FIG. 3 is an elevational view of the interior of the unitized refrigeration station taken generally along line 3—3 of FIGURE 1.

The objects of this invention may be achieved by mounting refrigeration compressors, receivers and associated equipment on a steel base and surrounding the equipment with a weather-tight structure composed of walls and roof. The unitized refrigeration station after completion of assembly is normally mounted on the roof of a large retail food store. Access to the station is normally through a hatch in the floor of the station leading through the roof of the store, although the station may be provided with means for access from the roof of the store. For greatest economy in installation the conduits, fittings and accessories necessary to the operation of the refrigerant compressors and receivers are pre-assembled with user connections grouped together at a common point for direct connection in a pipe run at the installation site. The electrical apparatus, conductors, etc., are similarly preassembled and grouped at a common point for user connections. Desirably the dimen-

sions of the completed station are within maximum limits for normal transportation by truck or railroad.

Turning now to FIGURES 1, 2 and 3, unitized refrigeration station 2 is made up of rectangular steel base 4 which is comprised of beams 6, 8, 10, 12, 14, 16. Lifting lugs 18, 20, 22, 24 are attached at each corner of base 4 in order to provide easy attachment for cables used to set the unitized refrigeration station into position at the installation site. Floor sections 26, 28 are mounted on beams 8, 12, 14, 16. Floor sections 30, 32 are mounted on beams 6, 8, 10, 16. Insulation 34 is provided under each of the floor sections.

Liquid refrigerant receivers 36, 38, 40 are mounted on floor sections 30, 32. Liquid refrigerant receivers 42, 44, 46 are mounted on floor sections 26, 28. Receivers 36, 38, 40 are mounted in a row along one end of rectangular refrigeration station 2, and receivers 42, 44, 46 are mounted in a row along the opposite end of station 2. Commercial temperature refrigeration compressors 48, 50, 54, 56 are mounted on top of receivers 36, 38, 42, 44, respectively, by vibration absorbing mountings 60. Commercial temperature refrigeration compressors provide refrigerant for refrigeration in a range of zero to plus 25° F. Low temperature refrigeration compressors 52, 58 are mounted on top of receivers 40, 46, respectively, by vibration absorbing mountings 60. Low temperature refrigeration compressors provide refrigerant for refrigeration in a range of zero to minus 40° F.

Low temperature compressors 52, 58 are used, for instance, in maintaining the frozen condition of food stuffs and are desirably cooled by a stream of ambient air directed across each of them by body cooling fans. Body cooling fan base 62 is mounted on floor sections 30, 32. Body cooling fan 64 driven by motor 66 is mounted on base 62 and arranged to cool compressor 52. Body cooling fan base 68 is mounted on floor sections 26, 28. Body cooling fan 70 and its motor drive 72 are mounted on base 68 and arranged to cool compressor 56. If desired, a spare compressor 59 may be stored under body cooling fan base 68 or 62.

The refrigeration equipment is protected from weather by walls 74, 76, 78, 80 mounted on beams, 6, 8, 14, 16, respectively. Roof 82 is supported by the walls. Insulation 83 is provided on all walls and roof. The combination of walls and roof forms a weather-tight structure completely enclosing the refrigeration equipment and permitting its operation and service under all weather conditions. Auxiliary access door 84 is mounted in wall 80 and may be used for access to and from the store roof. Exhaust fan 86 driven by motor 88 is mounted in wall 78. Exhaust fan 86 is equipped with gravity louvers 90, and is provided with a thermostatic control (not shown) to draw air from the store below for cooling in summer and heating in winter. Floor sections 92, 94, 96, 98 are supported by beams 10 and 12. Floor hatch 100 is supported by floor sections 94, 96, 98 and is covered by grating 102. Floor hatch 100 cooperates with an opening provided in the store roof. Fire door 104 is held open by cable 106 and is arranged to close by gravity over grating 102 upon fusing of fusible link 108 in the event of fire in the store below or in refrigeration station 2. Access through the hatch is by ladder 110 shown in phantom. Hoist sockets 112, 114, 116, 118 are mounted on floor sections 96, 98, 94, 94, respectively. Hoist 120 may be supported in any of these sockets and is arranged to raise and lower equipment through hatch 100 when grating 102 is removed.

Electrical switch gear housings 122, 124, 126 are desirably mounted on wall 76. Switch gear desirably includes disconnect, starters, overload protection, circuit breakers for defrost heaters, timers to energize the defrost

circuit, control equipment responsive to a source of signals external to the station, relays to operate controls, etc. All interior wiring in the station, all interwiring in the control cabinet, and wiring connecting the motor, compressor and panels are desirably factory completed. An external source of electrical energy may be connected by conductors to switch gear housing 124. Terminal strips 132, 134 are provided for field connections to remote equipment, such as a remote condenser fan motor, display case temperature transmitter, etc.

Each compressor is desirably complete with dryers, sight glasses, vibration eliminators, suction line filters, liquid line dryers, winter controls, defrost timers, oil pressure failure switches, hand valves, automatic controls for all season operation, and the like. All equipment and accessories are desirably preassembled and fully connected by conduits, conductors, etc. Particularly, suction and liquid line piping from the compressors and receivers and all associated piping, etc., are desirably factory completed and tested. Conduits for connection to equipment, etc., external to the station desirably extend to a common location in the periphery of the station, such as pipe run 128 adjacent to the hatch 100. Piping stubs 130 for connection to a remote air cooled condenser (not shown) extend outside of station 2 through walls 74, 78. If desired, these conduits may be grouped and pass through a wall at one common location.

The terms and expressions which have been employed are used as terms of description and not of limitation, and there is no intention in the use of such terms and expressions of excluding any equivalents of the features shown and described or portions thereof, but it is recognized that various modifications are possible within the scope of the invention claimed.

What is claimed is:

1. In a unitized refrigeration station the combination comprising a substantially rectangular metal base; a floor mounted on said base and substantially coextensive therewith; a plurality of refrigerated receivers mounted on said floor; a plurality of low temperature refrigeration compressors, each mounted on one of said refrigerant receivers; a plurality of commercial temperature refrigeration compressors, each mounted on one of said refrigerant receivers; a plurality of body cooling fans mounted on said floor and arranged so that each of said body cooling fans cools one of said low temperature refrigeration compressors; a plurality of walls mounted on said base; a roof mounted on said walls, said roof and walls forming a weather-tight enclosure about said base; an exhaust fan mounted in one of said walls responsive to temperature changes in said enclosure.

2. In a unitized refrigeration station as defined in claim 1 the combination further comprising electrical control equipment for controlling said compressors and fans; elec-

trical conductors connecting said electrical control equipment to said compressors and said fans and to a source of signals external to said station and to a source of electrical energy external to said unitized refrigeration station; and conduits connecting said compressors and receivers to a condenser external to said station and to refrigerant users external to said station, said conduits for connection to said external refrigerant users being grouped and extending to a common location adjacent said access hatch.

3. In a unitized refrigeration station the combination comprising a rectangular steel base; an insulated floor mounted on said steel base and coextensive therewith; six refrigerant receivers mounted on said floor, three of said receivers being disposed adjacent to each of the short ends of said rectangular base; two low temperature refrigeration compressors, each mounted on one of said refrigerant receivers, one at each end of said base; four commercial temperature refrigeration compressors, each mounted on one of said refrigerant receivers, two at each end of said base; two body cooling fans mounted on said floor and arranged so that each of said body cooling fans cools one of said low temperature refrigeration compressors; four walls mounted on said base; a roof mounted on said walls, said roof and walls forming a weather-tight enclosure about said base; an exhaust fan mounted in one of said walls responsive to temperature changes in said enclosure; electrical control equipment for controlling said compressors and fans; electrical conductors connecting said electrical control equipment to said compressors and said fans and to a source of signals external to said station and to a source of electrical energy external to said unitized refrigeration station; and conduits connecting said compressors and receivers to a condenser external to said station and to refrigerant users external to said station, said conduits for connection to said external refrigerant users being grouped and extending to a common location adjacent an access hatch.

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ROBERT A. O'LEARY, *Examiner.*

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,205,674

September 14, 1965

Gordon T. Arnold et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 39, for "refrigerated" read -- refrigerant --; column 4, line 49, for "2,336,681" read -- 2,336,671 --.

Signed and sealed this 5th day of April 1966.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents