Aug. 25, 1936. J. A. MACREADY ET AL 2,051,874

REFRIGERATING APPARATUS

Original Filed Sept. 29, 1923 4 Sheets-Sheet 1

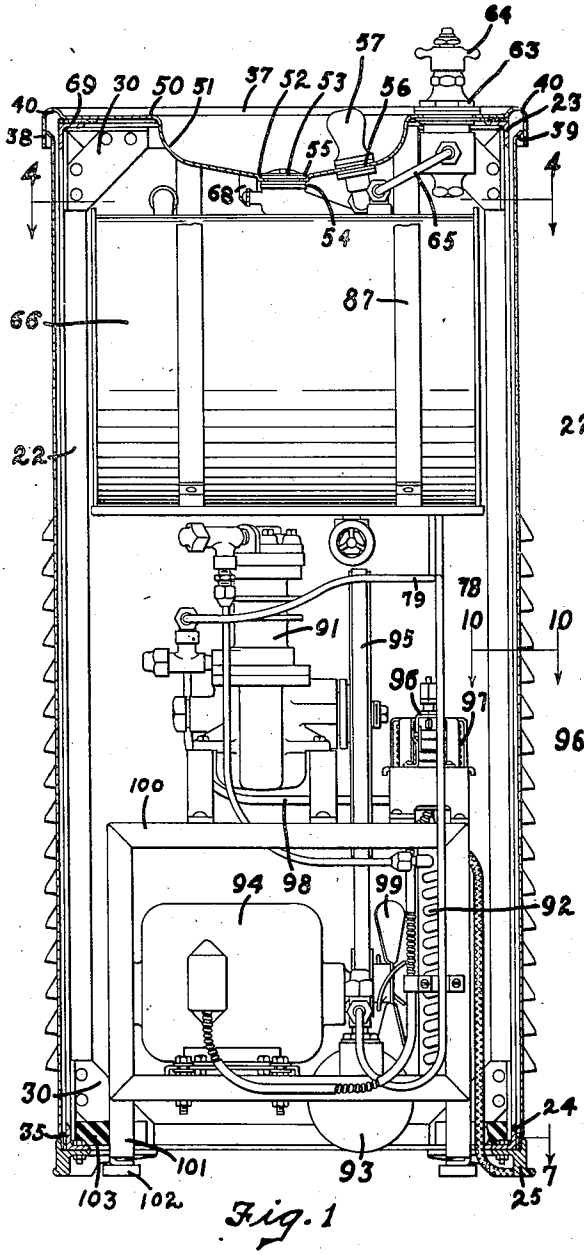


Fig. 1

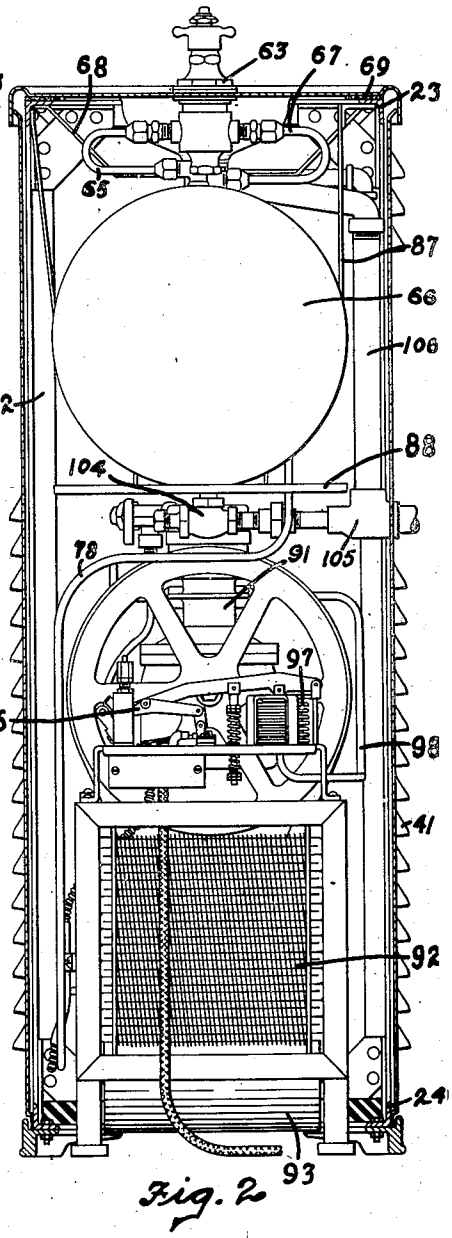


Fig. 2

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Original Filed Sept. 29, 1923 4 Sheets-Sheet 2

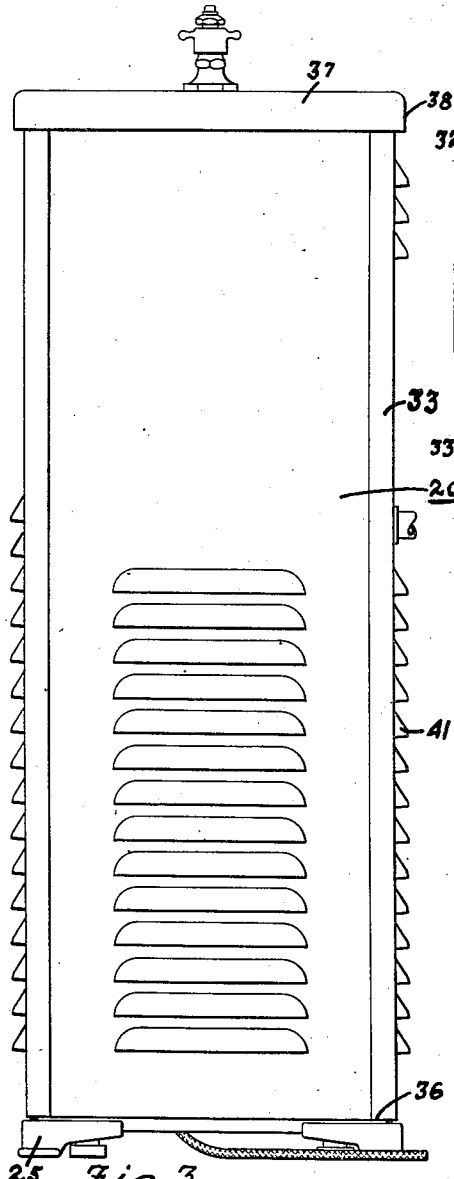


Fig. 3

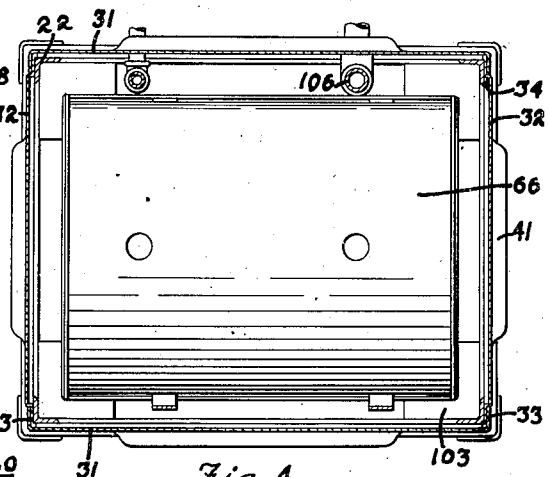


Fig. 4

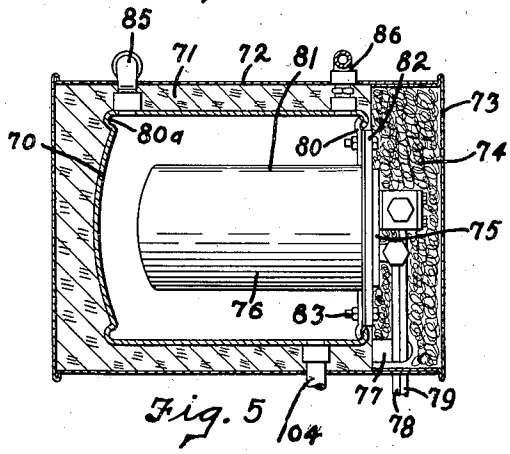


Fig. 5

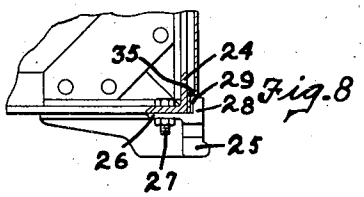


Fig. 8

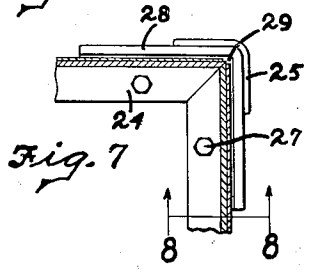


Fig. 7

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REFRIGERATING APPARATUS

Original Filed Sept. 29, 1923 4 Sheets-Sheet 3

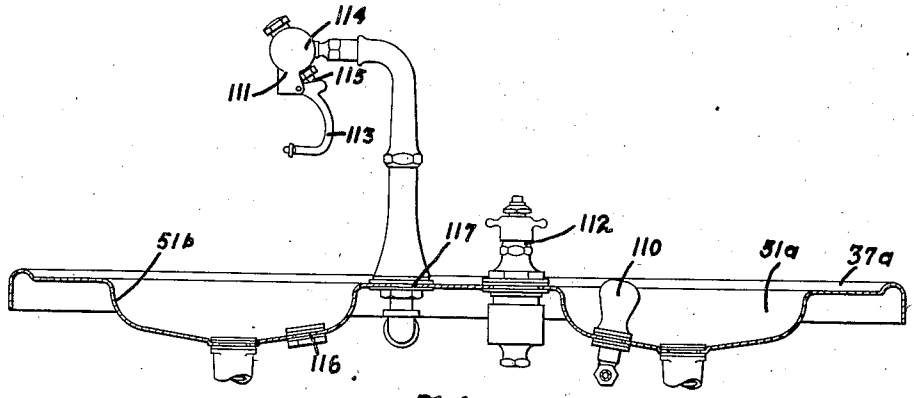


Fig. 12

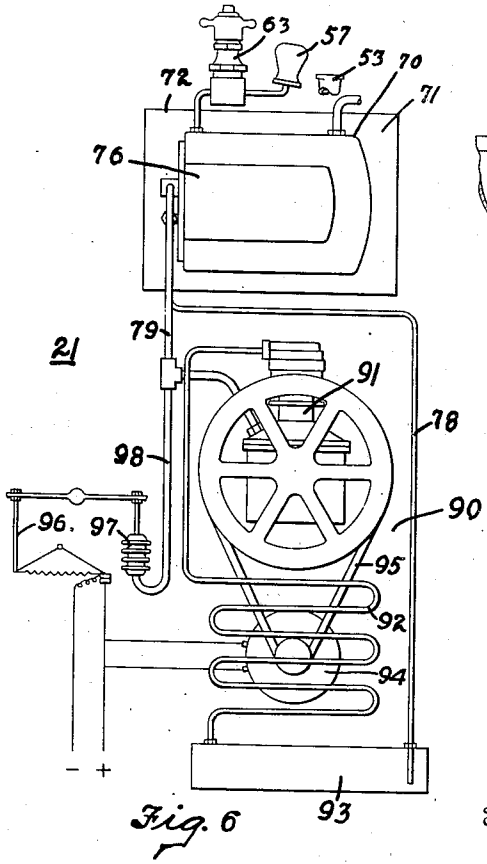


Fig. 6

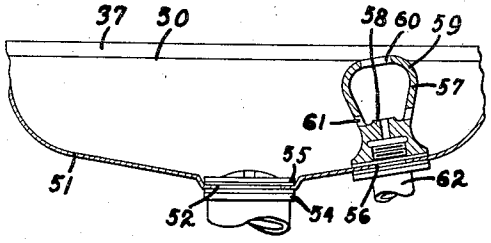


Fig. 9

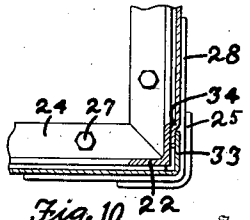


Fig. 10

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REFRIGERATING APPARATUS

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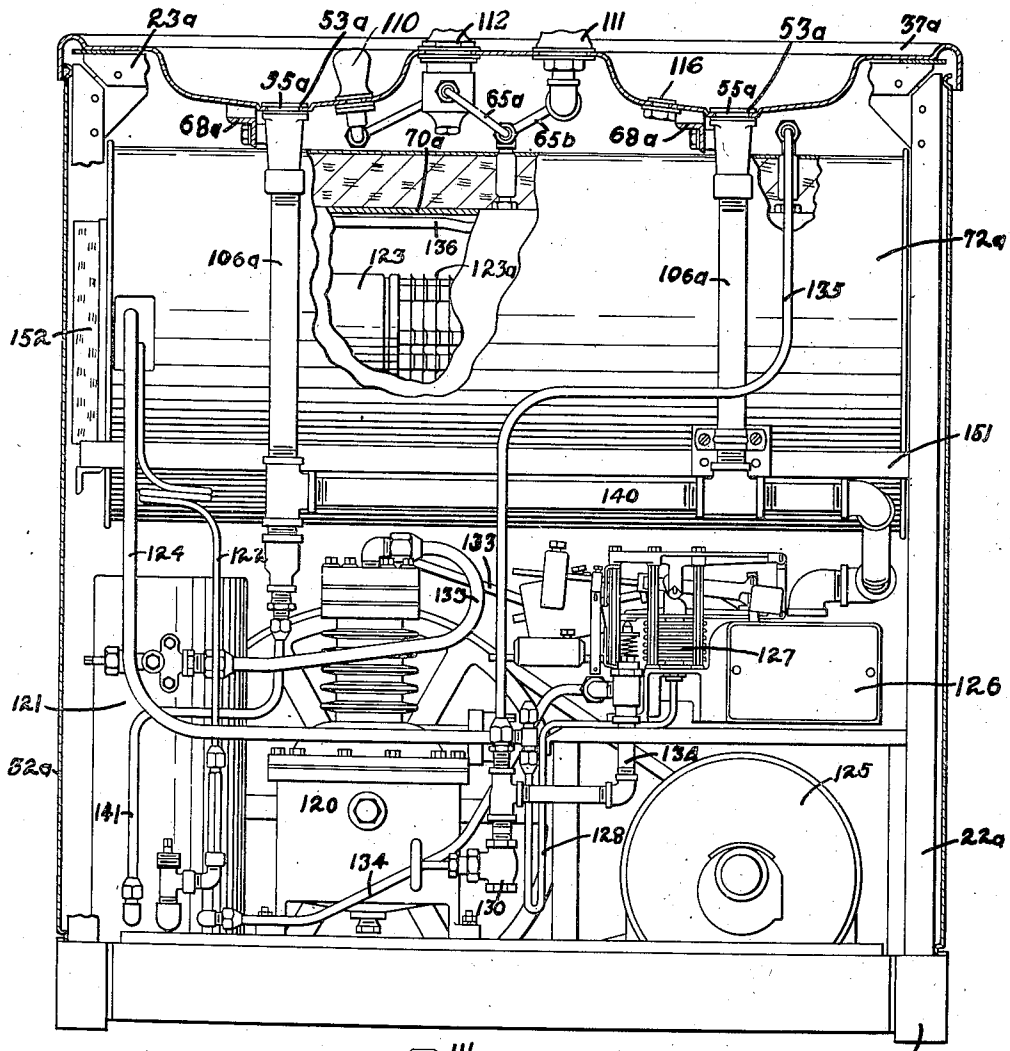


Fig. 11

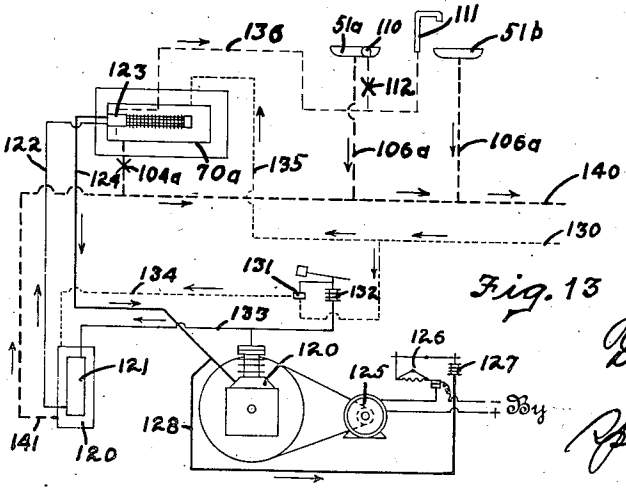


Fig. 13

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Patented Aug. 25, 1936 2,051,874

UNITED STATES PATENT OFFICE

2,051,874

REFRIGERATING APPARATUS

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Application September 29, 1928, Serial No. 309,216
Renewed April 19, 1935

6 Claims. (Cl. 312—141)

This invention relates to refrigerating apparatus and more particularly to an apparatus for cooling beverages, such as drinking water.

This application relates to water coolers, for instance of the type described in our Patent No. 1,847,092.

An object of this invention is to provide a mechanical water cooler encased in a readily accessible cabinet.

Another object of this invention is to provide a cabinet having readily removable panels for access into the interior.

Another object of this invention is to provide a sanitary top for a water cooling apparatus.

Another object of this invention is to provide a cabinet in which the sides and top may be made of porcelain enameled sheet metal, and in which the panels may be readily removed for access into the interior of the cabinet.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a vertical cross-sectional view of a water cooling apparatus embodying features of this invention;

Fig. 2 is another vertical cross-sectional view taken transversely to Fig. 1;

Fig. 3 is a vertical elevation of the apparatus shown in Figs. 1 and 2;

Fig. 4 is a horizontal cross-sectional view taken along the line 4—4 of Fig. 1;

Fig. 5 is a horizontal cross-sectional view of the water cooling tank shown in Fig. 1;

Fig. 6 is a diagrammatic view of a portion of the apparatus shown in Figs. 1 and 2;

Fig. 7 is a horizontal cross-sectional view, slightly enlarged, taken along the plane 7 of Fig. 1;

Fig. 8 is an enlarged cross-sectional view of a detail of the apparatus taken along the line 8—8 of Fig. 7;

Fig. 9 is an enlarged vertical cross-section of a top portion of the apparatus;

Fig. 10 is an enlarged horizontal cross-section taken along the line 10—10 of Fig. 1;

Fig. 11 is a vertical cross-sectional view of a slightly modified form of apparatus;

Fig. 12 is a vertical cross-sectional view of the top portion for the apparatus shown in Fig. 11; and

Fig. 13 is a diagrammatic view of a portion of the apparatus shown in Figs. 11 and 12.

Referring for the present more particularly to Figs. 1 to 10, inclusive, a refrigerating apparatus embodying features of this invention may comprise a water cooling cabinet generally designated as 20. Mounted on and within this cabinet is a water cooling system generally designated as 21, and shown more or less diagrammatically in Fig. 6. The water cooling system is so related to the cabinet 20 that the parts of the water cooling system 21 which are liable to necessitate adjustment or repairs, or which must be assembled within the cabinet, are readily accessible therein. The cabinet 20 and the system 21 are thus corelated to furnish a very efficient water cooling apparatus.

The cabinet 20 may comprise metal framework having vertical corner angle irons 22 joined at the top by horizontal corner angle irons 23. The bottoms of the angle irons 22 may be joined by horizontal corner angle irons 24. If desired, the horizontal angle irons 24 may be provided with ornamental pedestal members 25. The pedestal members 25 may be provided with horizontal attaching plates 26 through which bolts 27 may pass in order to attach the same to the angle irons 24. The pedestal members 25 may be provided with an L-shaped extension 28 adapted to form a channel 29 for receiving the bottoms of the panels hereinafter to be more fully described to form one specific embodiment of quickly detachable panel securing means. The angle iron members of the frame may be joined at the corners in any suitable manner and may be reinforced by gussets 30, which may be riveted or spot-welded to the angle irons of the frame.

The frame heretofore described, or any other suitable frame, may have mounted thereon the panel structure of the cabinet. The panel structure may comprise two vertical panels 31 and two vertical panels 32. Some of these panels, for instance the two panels 31, may be provided with vertical flanges 33 at their vertical edges. Some of the panels, for instance panels 32, may be provided with substantially straight edges, although these edges may be slightly offset as at 34 to enhance the appearance and efficiency of the joint thus formed. When assembled, the panels 31 and 32 are adapted to interlock at the corners, and, in this particular embodiment, the flanges 33 fit over the straight edges of the panels 32, overlapping to adjacent the offset portions 34. The lower edges of some or all of the panels are adapted to fit in the channels 29, and, for convenience, the bottoms of the panels may be offset at 35 in order to provide an efficient joint with the

channels 29. The flanges 33 may terminate at the offset portion 35, and thus the flanges 33 do not extend below their lower edges 36. The panels thus assembled are held from spreading apart at the top by any suitable means such as by means of the top panel 37. The top plate 37 may be provided with a downwardly directed flange 38, which, in this particular embodiment, is a continuous flange around the entire periphery of the plate 37. The upper portions of the panels may be provided with a slight bend 39 in order to hold the panels more snugly under the flange 38 and thus prevent rattling. The tops of the panels 31 and 32 terminate a slight distance below the top 40 of the flange 38. Thus the panels, when they are to be removed, may be lifted slightly so that their lower edges are lifted above the L-shaped extension 28. The lower portion of each panel may be then swung outwardly and the entire panel swung slightly downwardly in order to remove its upper edge from under the flange 38. In this particular embodiment, either one of the panels 31 may be first removed without disturbing other panels. Also after removing both of the panels 31, either one of the panels 32 may be removed. It is thus apparent that the side panel structure of the cabinet may be assembled without the use of screws, bolts or other fastening devices of that character, and that the panels may be removed almost instantaneously.

If the mechanical refrigerating system includes an air-cooling condenser, or if it is otherwise desirable, louvers 41 may be struck either outwardly or inwardly in the panels for permitting circulation of air into the cabinet. These louvers are also convenient when removing the panels, as they may be used as handles for the purpose. It is obvious that the louvers may be omitted and handles of some other character may be provided if desired.

The top plate 37 may be of any suitable construction, but in this particular embodiment, it is preferred to have a substantially flat portion 50 from which the downwardly directed bowl 51 may be integrally pressed. The flange 38 may be integrally formed by providing the curved portion 40 which also acts as a rim for preventing water from running down the side of the cabinet if it should be splashed on portion 50. The panels 31, 32 and the top 37 may be formed of porcelain enameled sheet metal and thus present a very attractive appearance as well as a very sanitary construction. The bottom of the bowl 51 may be provided with a countersunk opening 52 to which the drain fitting 53 may be attached. The drain fitting 53 is of any suitable construction, and may include a lower flanged structure 54 having threaded engagement with an upper flanged structure 55 adapted to pinch between their edges the periphery of the countersunk opening 52.

Another opening 56 may be provided along the slanting portion of the bowl 51. Through this opening a bubbling cup fitting 57 may be attached to the top 37. The fitting 57 may include a water discharge nozzle 58 having a lip guard 59 provided with an opening 60 through which the stream from the nozzle 58 is adapted to pass. The guard 59 may also be provided with openings 61 to permit the fitting to drain completely. The upper part of the fitting 57 has a flanged and threaded engagement with the lower portion 62 of the fitting and these two portions are adapted to engage between them with suitable gaskets, if necessary, the portion of the bowl surrounding the opening 56. The fixture 57 is adapted to be connected by suitable tubing to a combined automatic pressure-regulator and valve 63. The valve is adapted to be moved by a spring returned handle 64. The fitting 63 is also of the flanged and threaded engagement type adapted to engage a portion of the plate 37 in the manner heretofore described for fittings 53 and 57. An automatic pressure-regulator within the fitting limits the pressure on the nozzle 58. The fitting 63 is connected by means of flexible copper tubing 65 with a water cooling tank generally designated as 66. It is also connected by flexible tubing 67 with the fitting 57. Thus it is seen that water delivered from the tank 66 to the fitting 63 is delivered to the fitting 57 when the valve is operated. The stream leaving the nozzle 58 is directed upwardly in a slanting direction so that it does not fall back on the fitting 57 but falls on some portion of the bowl 51 and forms at its apex the desired stream for permitting a person to drink without touching the fixture 57. The maximum pressure permitted by the automatic pressure-regulator prevents the stream from being directed beyond the periphery of the bowl 51.

The top plate 37 may be moved slightly upwardly when desired merely by unscrewing the top portion 55 of the drain fitting 53. Since the connections between the plate 37 and the tank 66 are flexible, the top plate 37 may be moved relatively to the tank 66 and to the frame of the cabinet. If desired the drain fitting 53 may be rigidly secured to the frame by means of a U-shaped metal piece 68 to which the lower portion 54 of the drain fitting 53 may be bolted. If desirable, suitable cushioning means 69 may be interposed between the plate 37 and the top angle irons 23. The pipe connections can thus be made between the top 37 and the tank 66 and the top may then be lowered into place.

The water cooling mechanism may be of any suitable construction. For instance it may include a substantially cylindrical tank 70 provided with insulation 71 which may be held in place by a substantially cylindrical outer casing 72. The outer casing 72 may have telescoping therewith a cover 73 which may be removed together with its insulation 74, for instance of kapok, in order to permit access to the float valve plate 75 of the water cooling element or evaporator 76. The cover 73 may be provided with a notch 77 which permits the refrigerant lines 78 and 79 to pass to the water cooling element 76. The tank 70 may be cylindrical and may be provided with an end plate 80 to which the water cooling element may be secured. The water cooling element 76 may be of the character disclosed in the patent to R. G. Osborn, No. 1,556,708, patented October 13, 1925, with the exception that the depending loops may be omitted, if desired. A cylindrical spun brass portion 81 may have attached thereto a brass flange 82 which is adapted to be bolted, with an interposed gasket, to the end plate 80 of the tank 70. Insertable within the boiler 81 is the plate 75 carrying a float controlled valve and outlet fitting substantially of the type disclosed in the patent to Osborn. If desired the boiler 81 may be removed from the tank by releasing the bolts 83 which secure the flange 82 to the plate 80. The water from any suitable supply enters the tank 70 through the inlet 85 and leaves the tank through the outlet 86. Either the inlet 85 or the outlet 86 may be positioned at a point where the water is last to freeze should the water in the tank 70 be accidentally frozen. This is in accordance with the disclosure in our patent here-

inbefore referred to. The other end of the tank may be provided with a groove 80a, as shown to aid in the preventing of bursting in case of accidental freezing. The tank 70 together with its insulation may be suspended from the upper angle iron 23 by means of straps 87 passing underneath the cylindrical casing 72.

A pan 88 may be suspended from the casing 72 in order to catch any condensation which may form on the casing 72. However, under some circumstances the heat generated by the compressor, hereinafter to be described, may be sufficient to prevent the formation of enough condensation to cause the same to drip in the pan 88. If any water flows into the pan 88 it is evaporated by the heat from the compressor or by the air flowing through the cabinet.

The liquid cooling unit 76 may be of the volatile or unvolatile refrigerent type. In this particular embodiment, it may be a float valve-controlled evaporator of the type disclosed in the patent to Osborn. The evaporator 76 may be supplied with liquid refrigerant from any suitable source. For instance, it may be supplied with liquid refrigerant by a refrigerant liquefying unit 90 which may be located within the cabinet 20, if desired. The refrigerant liquefying unit may comprise a compressor 91 delivering compressed refrigerant to a condenser 92 which delivers liquefied refrigerant to a receiver 93. The liquid refrigerant in the receiver 93 may be delivered by the pipe 78 to the evaporator 76. The refrigerant evaporated in the evaporator 76 may be returned by the pipe 79 to the compressor 91, preferably in the crankcase of the compressor. The compressor 91 may be driven by a motor 94 which may be connected by the belt 95 with the compressor 91. The motor 94 may be started and stopped by means of a snap switch 96 operated by an expansible bellows 97 which may be connected with the evaporated refrigerant line 79 by means of the pipe 98. The motor 94 may be provided with a fan 99 which is adapted to cause circulation of air for the cooling of the condenser 92, the compressor 91 and the motor 94. The refrigerant liquefying unit 90 may be mounted on a substantially box-like angle iron frame 100 which may be provided with pedestals 101 adapted to rest on rubber mountings 102 and which may be laterally spaced from the frame by means of rubber cushions 103. However, the refrigerant liquefying unit may be of the type disclosed in the application of John A. Macready for Refrigerating apparatus Serial No. 308,927, filed September 28, 1928.

The tank 70 may be provided with drain means 104 which may be coupled by means of the coupling 105 with the drain 106 leading from the drain fitting 53. A suitable valve may be included in the drain fitting 104 which may be normally closed, but which may be opened if it is desired to drain the tank 70.

The water cooling apparatus may be slightly modified. For instance it may be of the type disclosed in Figs. 11, 12 and 13 in which there are two water outlets 110 and 111. The water outlet 110 may be of the bubbling cut type and may be controlled by the combined valve and pressure regulator 112. The fittings 112, and 63 and 111 may have a water regulator which maintains a substantially constant pressure on their respective discharge fittings and thus limits the pressure of the stream leaving these fittings. The fitting 111 may be of the type ordinarily used to fill tumblers. This may be accomplished by placing the tumbler on the swinging fork-like member 113, of the well-known character, which opens the valve 114 by the contact at 115. The valve 114 may be provided with an automatic pressure regulating valve. In this particular embodiment, the top plate 37a has the two bowls 51a and 51b. These two bowls are symmetrical with respect to each other. Thus either the type of fitting 111 or the type of fittings 110 and 112 may be installed in either of the bowls 51a or 51b. The opening 116 may be plugged when type of fitting 111 is used or it may be used for the fitting 110 while at the same time the opening 117 would be used for a valve fitting such as 112. It is thus seen that these fittings are interchangeable in either of the bowls 51a or 51b. The panel structure for the water cooling apparatus disclosed in Figs. 11 to 13 is substantially the same as that heretofore disclosed with the exception that the top plate 37a is made for a double water outlet. The drain fittings 53a are connected by means of U-shaped angle irons 68a to the upper angle iron members 23a. The tank 70a is connected by means of flexible tubing 65a and 65b with the fittings 111 and 112 in order that the plate 37a may be moved upwardly merely by the removal of the drain plates 55a.

In this embodiment the compressor 120 delivers compressed refrigerant to a water cooled condenser 121. The condenser 121 delivers liquefied refrigerant through the pipe 122 to the evaporator 123. The evaporated refrigerant returns by the pipe 124 to the compressor 120. The compressor 120 is driven by means of a motor 125 controlled by a snap switch 126. The snap switch 126 is operated by an expansible bellows 127 connected by a pipe 128 with the evaporated refrigerant line 124. Water from any suitable supply is delivered by a pipe 130 to the condenser control switch 131 which is operated by an expansible bellows 132 which is connected to the refrigerant pressure line 133. Thus water is delivered through the pipe 134 to the condenser 121 whenever required by the portion of the condenser 120. Another branch 135 from the pipe 130 delivers water to the tank 70a where it is cooled by the evaporator 123. The cooled water is delivered by the pipe 136 to the fittings 110 and 111. The valve 112 controls the flow of water to the fitting 110. Waste lines 106a lead from the bowls 51a and 51b. These are connected to the drain pipe 140 which also receives the discharge from the condenser 121 by means of a pipe 141 connected to the water jacket of the condenser 121. The structure of the modification shown in Figs. 11 to 13 inclusive is more particularly described, in some respects, in our patent hereinbefore referred to. The lower pedestal structure 150 may differ slightly from the pedestals 25. In this particular embodiment, the pedestal structure 150 may be a solid metal square structure which is adapted to be connected to the vertical angle iron members 22a similarly to the pedestal structure member 25. The outer casing 72a may be supported by longitudinal angle iron members 151 connected to the angle iron members 22a. Access is provided to the evaporator 123 by the removal of the panel 32a and by the removal of the insulation 152 at the end of the casing 72a in a manner similar to that provided for the modification heretofore described.

The evaporator 123 may be of the type more fully described in the patent to Jesse G. King No. 1,929,697 issued October 10, 1933. The fins 123a in the evaporator may be made of a shape to

render the evaporator readily insertable in and removable from the tank 70a. For instance, the fins 123a may be circular, having approximately the same diameter as the cylindrical float chamber to which the numeral 123 has been applied in Fig. 11. Thus the evaporator may be readily inserted through a circular opening in the end wall of the tank 70a. The opening may be closed by a flanged construction on the float chamber similar to that disclosed in Fig. 5.

The heat from the compressor in water coolers embodying this invention also aids in preventing condensation on the waste water bowls. By making the bowls integral with the top and countersunk therein, the heat from the machinery prevents condensation on the bowls.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A refrigerating apparatus comprising a frame within which a refrigerating mechanism may be placed having uprights and panel rests, said rests having notches for preventing outward movement of the panels, panels having substantially flat vertical edges and panels having bent vertical edges, the bent vertical edges fitting over the flat edges, and a top having downwardly directed portions for preventing the outward movement of said panels, said top being supported on said uprights independently of said panels to permit upward movement of said panels sufficient to move said panels above said notches without movement of said top for the removal of said panels.

2. A refrigerating apparatus comprising a frame within which a refrigerating mechanism may be placed, four vertical side panels on the vertical sides of said frame having locking engagement at their lower edges with said frame, the vertical edges of said panels overlapping each other, each of said panels being freely movable vertically to effect said locking engagement but being locked against horizontal movement by said locking engagement.

3. A refrigerating apparatus comprising a frame adapted to rest on the floor and including vertical uprights, a top carried by said frame, said top having a downwardly directed circumferential flange, panels having a locking engagement with said frame engageable and disengageable by a vertical movement of said panels, said panels having their upper edges normally extending behind said flange and being movable vertically under said flange to engage and disengage said panels on said frame, one of said panels having a vertical edge extending over a vertical edge of the other of said panels.

4. A refrigerating apparatus comprising a frame adapted to rest on the floor and including vertical uprights, a top carried by said frame, said top having a downwardly directed circumferential flange, panels with their main surfaces substantially at right angles to each other and having a locking engagement with said frame engageable and disengageable by a vertical movement of said panels, said panels having their upper edges normally extending behind said flange and being movable vertically under said flange to engage and disengage said panels on said frame, one of said panels having a vertical edge extending over a vertical edge of the other of said panels.

5. A refrigerating apparatus comprising a frame within which a refrigerating mechanism may be placed having four corner uprights and panel rests below the top of said frame, panels in four different planes removably positioned on said frame and having means engageable with said panel rests to prevent outward movement of the bottom of said panels and having automatically releasable interlocking means along their vertical edges, and a top covering said uprights and having downwardly directed portions for preventing the outward movement of the top of said panels, said top being supported on said uprights independently of said panels to permit upward movement of said panels sufficient to move said panels out of engagement with said panel rests without movement of said top for the removal of said panels.

6. A refrigerating apparatus comprising a frame within which a refrigerating mechanism may be placed, an outer wall vertical panel removably mounted on said frame and having a flat vertical edge at one corner of the apparatus, means forming a portion of the outer wall of said apparatus and having a vertical flange overlapping the flat vertical edge of said panel, and stationary means permanently associated with said frame for releasably retaining said first mentioned means against lateral displacement, said first mentioned means being removable by vertical movement relative to said frame and said second mentioned means while said panel and second mentioned means remain stationary.

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