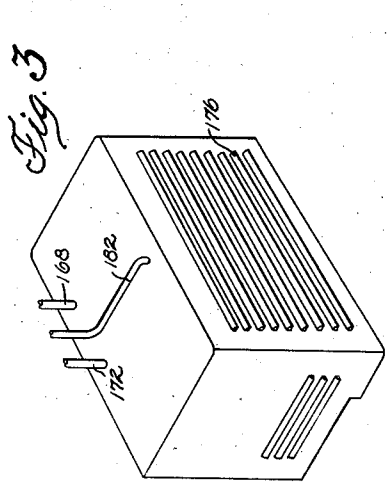
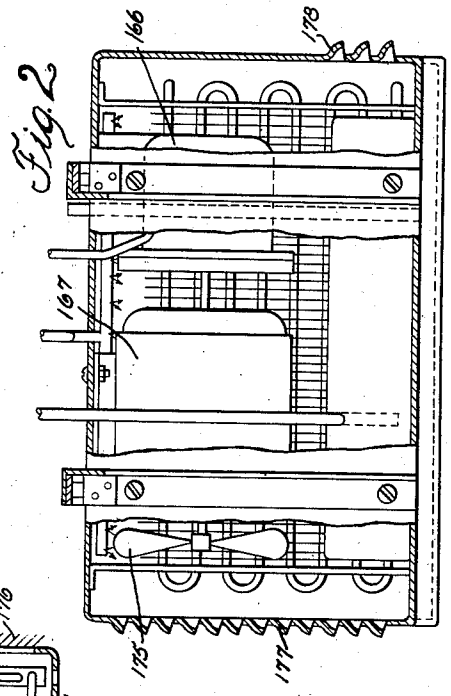
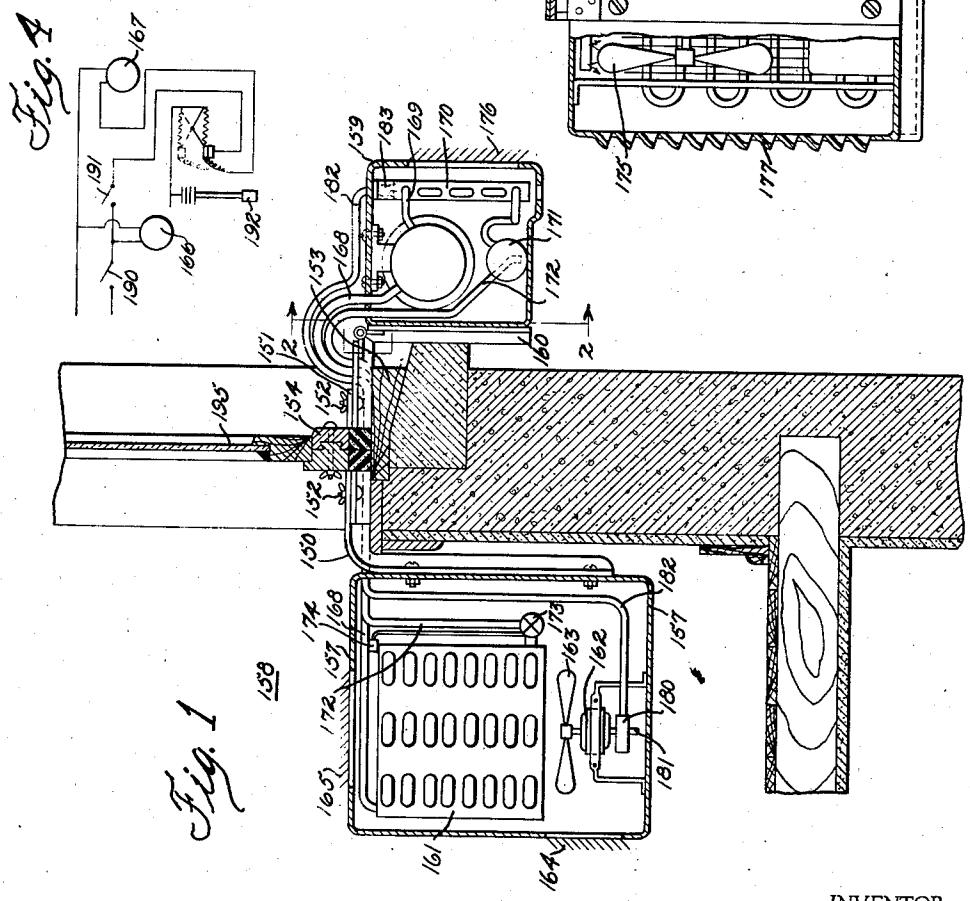
June 1, 1943. H. B. HULL 2,320,436

REFRIGERATING APPARATUS

Original Filed Dec. 31, 1938 2 Sheets-Sheet 1







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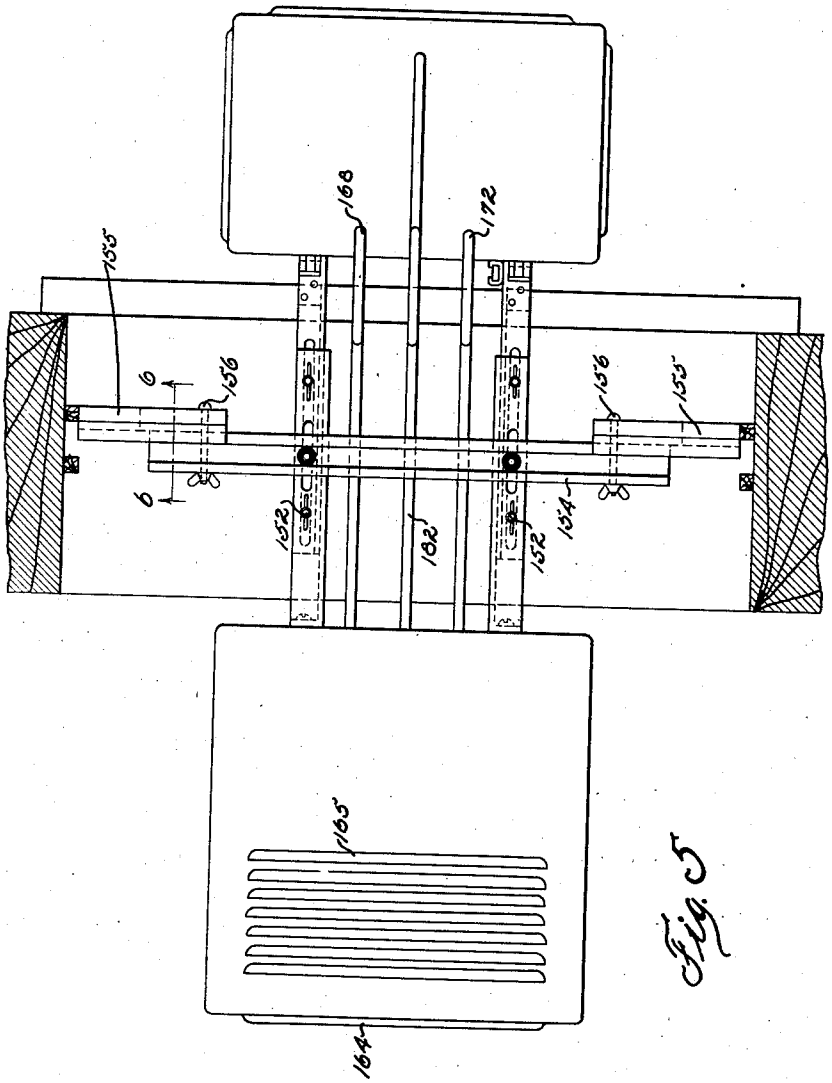


Fig. 5

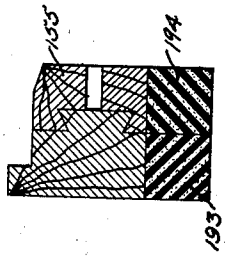


Fig. 6

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Patented June 1, 1943

2,320,436

UNITED STATES PATENT OFFICE

2,320,436

REFRIGERATING APPARATUS

Harry B. Hull, Dayton, Ohio, assignor to General Motors Corporation, Dayton, Ohio, a corporation of Delaware

Original application December 31, 1938, Serial No. 248,679. Divided and this application May 28, 1941, Serial No. 395,648

7 Claims. (Cl. 62—129)

This invention relates to refrigeration.

It is an object of this invention to provide a self-contained room cooler or conditioner which is adapted to be installed in rooms and other enclosures without the necessity of connecting water pipes to the cooler.

This application is a division of my copending application Ser. No. 248,679 now Patent No. 2,268,451 granted Dec. 30, 1941. The patent, in turn, is a continuation-in-part of my copending application Ser. No. 749,773, filed Oct. 24, 1934. The matter shown and claimed in this case is also shown in the two earlier filed cases.

It is recognized that applicant is not the first to provide a portable room cooler of the type in which an evaporator is mounted within the space to be conditioned and an air cooled condenser is mounted outside the space to be conditioned. Others have provided self-contained cabinets adapted to be placed directly in the window opening and supported on the window ledge with one portion of the cabinet projecting into the room and housing the evaporator and another portion of the cabinet projecting outside the room and housing the condenser. Units of the type in which the main cabinet is mounted directly in the window opening have numerous disadvantages, however, which have been overcome by my arrangement as disclosed herein. One of the disadvantages of a unit of the type in which a single cabinet is provided for housing both the evaporator and the refrigerant liquefying unit is that the noises produced by the refrigerant liquefying apparatus are readily transmitted into the conditions space through the walls of the cabniet.

Another disadvantage of the prior art units is that the cabinets take up too much valuable window space whereas with my improved arrangement, the window may be substantially closed while the apparatus is in place.

Another disadvantage of the prior art arrangements is that the minimum practical width of a cabinet is greater than the width of many modern window openings. By using brackets for mounting the unit as disclosed herein the cabinet may be made wider than the window if necessary. One object of my invention, therefore, is to provide a self-contained room cooler of the window sill type which requires only a small window opening and does not materially interfere with the closing of the window.

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, somewhat diagrammatic, of a room cooler embodying features of my invention;

Fig. 2 is a vertical cross-sectional view taken along the lines 2—2 of Fig. 1;

Fig. 3 is a view in perspective of a portion of Fig. 1;

Fig. 4 is a circuit diagram for the electrical controls;

Fig. 5 is a horizontal cross-sectional view, with portions of the window removed of the apparatus shown in Fig. 1; and

Fig. 6 is a cross-sectional view of a detail.

An apparatus embodying features of my invention includes in general an air cooling or conditioning device adapted to be placed in a room or the like, with a heat absorber in the room and with a heat dissipator having at least a portion thereof extending through a window of the room, the entire structure being preferably joined to form a unitary device when it is assembled or installed in the room.

As shown in Figs. 1 to 6 inclusive, the compressor 166, together with its motor 167, may be placed outside of the window 195. In this unit a U-shaped bracket means or structure is formed by the arms 150 and 151 adjustably secured together at 152 to compensate for any wall width. This U-shaped structure is hung over the sill 153, and a false sill structure 154 is arranged therewith to engage with the sash. Thus the false sill is provided with lateral adjusting strips so that the false sill may be adjusted to any width of window desired. This lateral adjustment is secured by means of the bolts 156.

The air cooling casing 157 is secured to the arms 150 and hangs in the room 158 while the heat dissipating casing 159 is secured to the arms 151 through the medium of the hinged brackets 160. An evaporator 161 is placed in the casing 157 together with a motor 162 which drives the fan 163. The fan 163 causes air to flow from the room 158 through the opening 164 over the evaporator 161 and be discharged back into room through the opening 165. The refrigerant is caused to circulate through the system by means of a compressor 166 which is driven by a motor 167 both located within the casing 159. Refrigerant in the evaporator 161 flows through the pipe 168 to the compressor 166 from whence it is discharged in compressed condition through the pipe 169 to the condenser 170. The refrigerant

there condensed is gathered in the receiver 171 and flows therefrom through the pipe 172 to the expansion valve 173 which is provided with a thermostatic bulb 174. The action of the valve 173 and bulb 174 is substantially identical with that of valve 24 and bulb 27 as shown in Fig. 1 of my copending application Serial No. 749,773, of which this application is a division. The motor 167 also drives a fan 175 which causes air to flow from the inlet 176 over the condenser 170 and be discharged through the outlet 177. In addition, if desired, a small air inlet may also be provided at 178 along one side of the casing 159. All of the connections between the casings 157 and 159, may pass through the false sill 154 as will be readily understood.

The moisture condensed on the evaporator 161 gathers at the lower portion of the casing 157 and enters the pump 180 through the pipe 181. The pump 180 may be driven by the motor 162 and discharges the condensate through the pipe 182 to the spray-head 183 placed over the condenser 170. As heretofore described with respect to Fig. 6, of said copending application Serial No. 749,773, this condensate then evaporates as it flows over the condenser 160 and is discharged to the atmosphere outside of the room.

The motor 162 may be controlled by a hand-switch 190 so that the fan 163 may be operated without refrigeration, if desired. When refrigeration is desired the hand switch 191 is also closed after which the thermostat 192 similar to thermostat 47, of the above mentioned application causes the motor 167 to operate in accordance with conditions in the room 158.

The false sill structure may be of any character desired. Conveniently, the central section 154 may rest on a central rubber section 193. The extensions 155 may rest on extensoin rubber sections 194. The sections 154 and 155 are laterally adjustable as heretofore described for any size window and they are of such a width that a sash 195 rests on both the sections 154 and 155 and thus makes a substantially air-tight joint at the lower portion. The sash may be shortened by cutting off the lower portion, or, if necessary, a new sash of proper length may be substituted. The sill structure herein shown is merely exemplary and it is to be understood that any sill structure may be used, as for example, a sill of the exact dimensions to fit the window.

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 sdopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Apparatus for conditioning air for a room or the like comprising in combination, a cabinet disposed within said room, an evaporator within said cabinet, a motor-compressor unit, a condenser located outside of said room, refrigerant flow connections between said condenser, evaporator and compressor, and common means for supporting said condenser and said cabinet, said last named means including means for adjusting the position of said condenser relative to said cabinet.

2. A window mounted air conditioning apparatus for conditioning air for a room having a window opening comprising in combination, a cabinet disposed within said room adjacent said window, an evaporator within said cabinet, a condenser, a compressor, fluid flow connections between said evaporator, condenser and compressor, a fan for circulating air over said evaporator, condenser supporting means supported by the window opening and secured to said cabinet and having a portion projecting through said window, said means comprising a hinged connection whereby said condenser may be swung relative to the window opening from a position in front of the window to a position away from the window, and means for circulating air over said condenser, and means for mounting said compressor on said condenser supporting means.

3. A window mounted air conditioning apparatus for conditioning air for a room having a window comprising in combination, a cabinet disposed within said room adjacent said window, an evaporator within said cabinet, a condenser, a compressor, fluid flow connections between said evaporator, condenser and compressor, a fan for circulating air over said evaporator, condenser supporting means secured to said cabinet and having a portion projecting through said window, said means comprising a hinged connection whereby said condenser may be swung relative to the window opening from a position in front of the window to a position away from the window, and means for circulating air over said condenser.

4. A room cooling structure comprising a room cooling section including a casing and an evaporator therein, a refrigerant liquefying section including a casing and a condenser therein, relatively shallow bracket means connecting said casings, said structure being so constructed and arranged as to form a recess for receiving a portion of the wall below the sill structure of a window, refrigerant flow means between said evaporator and said condenser, the elements of said structure being so constructed and arranged that when mounted on a window sill, the uppermost portion of one of said sections does not extend to a higher level than any portion of the bracket means, said refrigerant flow means being so disposed with respect to said bracket means so as to be protected thereby from impact by the sash of the window as the latter moves substantially into its normally closed position.

5. In combination with a room wall having a window therein, a room air conditioning unit comprising relatively shallow supporting bracket means passing through said window, a self-contained room cooling section including a casing and an evaporator therein supported by said bracket means adjacent the inside wall below said window, a self-contained heat dissipating section including a casing and a condenser therein supported by said bracket means adjacent the outside wall below the window, and heat transfer means between said evaporator and said condenser, said sections being so arranged with respect to said bracket means so as not to diminish to any material extent the passage of light through the window opening.

6. A room cooling structure comprising a room cooling section including an evaporator, a refrigerant liquefying section including a condenser, bracket means connecting said sections, said sections and said bracket means being so constructed and arranged as to form a recess for receiving a portion of the wall below the sill structure of a window, refrigerant flow means between said evaporator and said condenser, said room cooling section including a housing secured to said bracket means and having an air inlet and an air outlet, and said heat dissipating section including a separate housing secured to said bracket

means and having an air inlet and an air outlet for the outside air, said sections and said bracket means being so constructed and arranged so as not to materially extend above the surface on which the bracket means rests.

7. In combination with a room wall having a window therein, air conditioning apparatus comprising relatively shallow supporting bracket means passing through said window, a heat absorbing section including a casing and an evaporator therein carried by said bracket means within the room, a heat dissipating section including a casing and a condenser therein carried by said bracket means outside said room, and heat transfer means between said heat absorbing section and said heat dissipating section, said bracket means and the elements carried thereby being so constructed and arranged so as to straddle the wall adjacent said window without materially intercepting the passing of light through the window opening.

HARRY B. HULL.