Sept. 19, 1961 T. G. CRIDER 3,000,193

AIR CONDITIONING EVAPORATORS

Filed Feb. 21, 1958 2 Sheets-Sheet 1

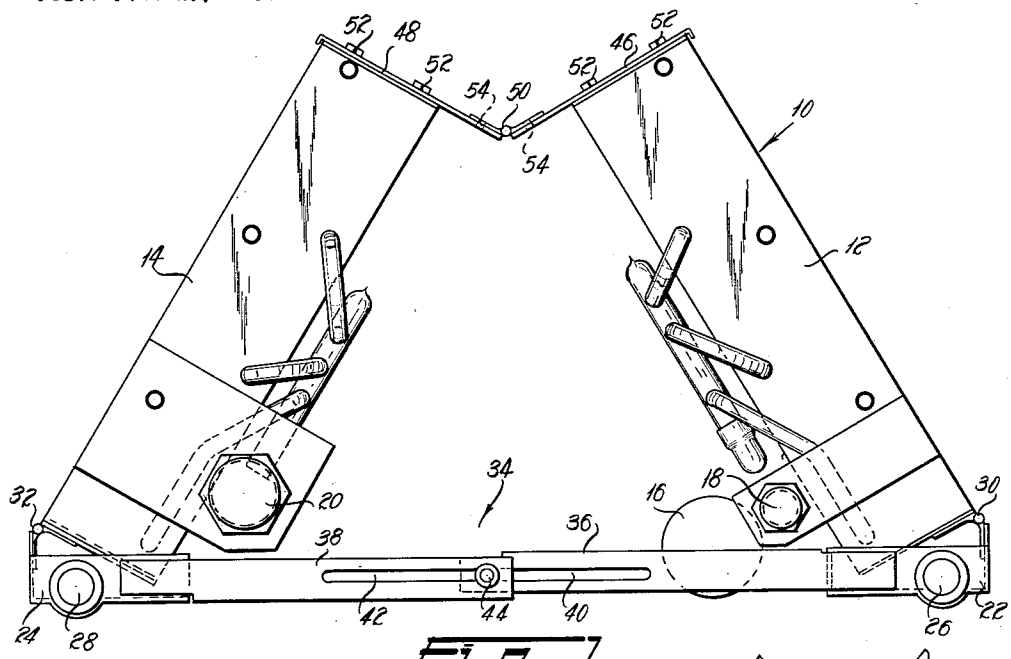


Fig. 1

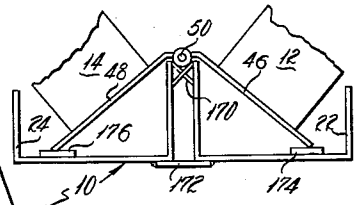


Fig. 3

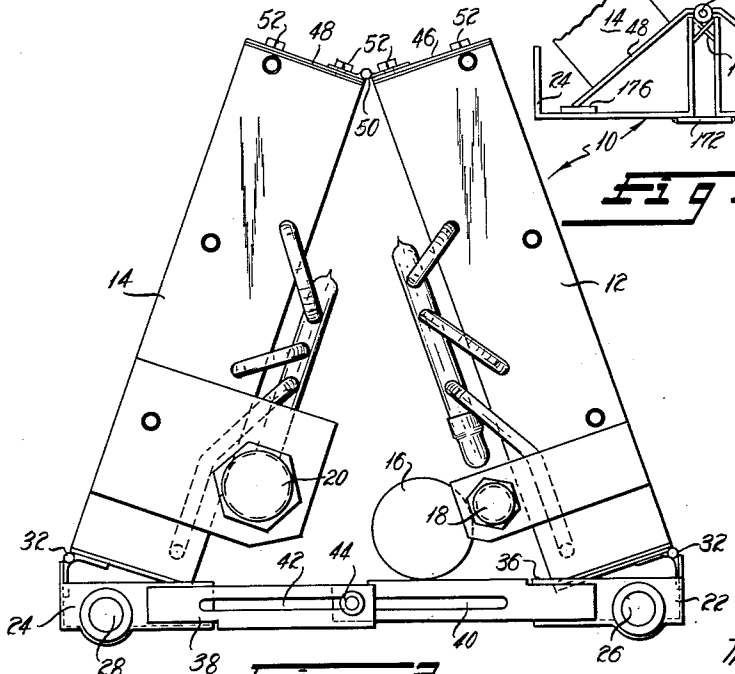


Fig. 2

INVENTOR
THOMAS G. CRIDER

BY Strauch, Nolan & Neale

ATTORNEYS

Sept. 19, 1961 T. G. CRIDER 3,000,193

AIR CONDITIONING EVAPORATORS

Filed Feb. 21, 1958 2 Sheets-Sheet 2

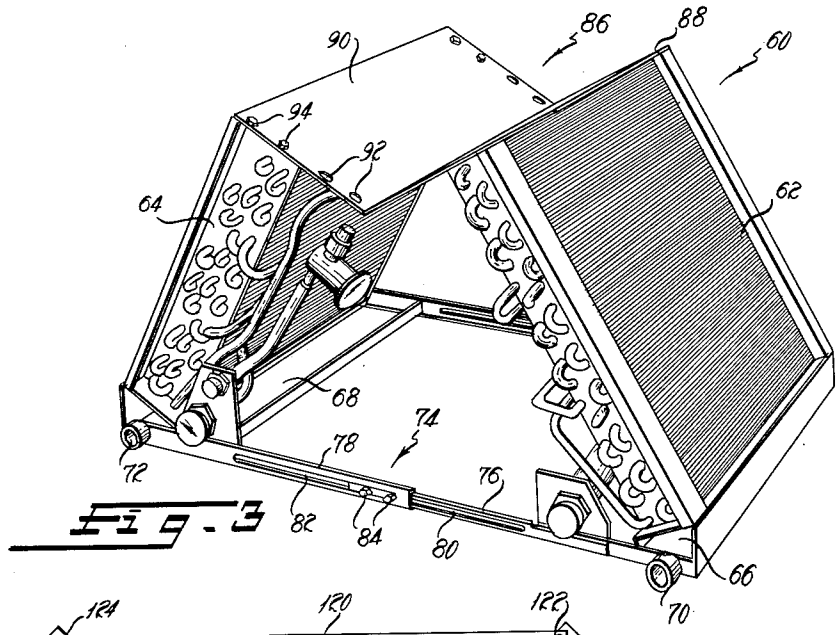


Fig. 3

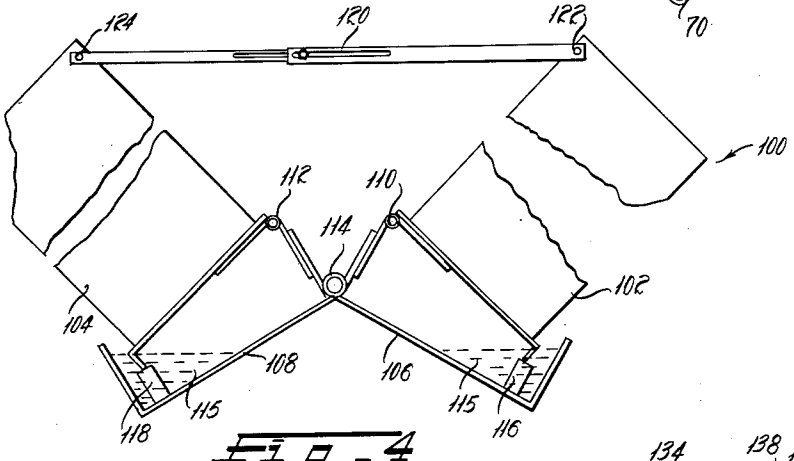


Fig. 4

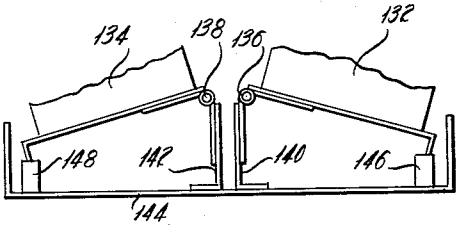


Fig. 5

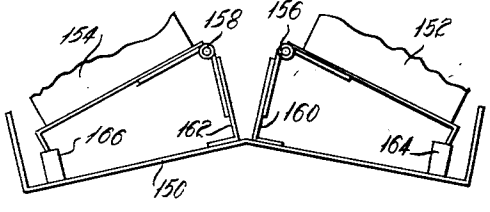


Fig. 6

INVENTOR
THOMAS G. CRIDER

BY Strauch, Nolan & Neale

ATTORNEYS

United States Patent Office 3,000,193 Patented Sept. 19, 1961

3,000,193

AIR CONDITIONING EVAPORATORS

Thomas G. Crider, Lakewood, Ohio, assignor to Hupp Corporation, Cleveland, Ohio

Filed Feb. 21, 1958, Ser. No. 716,749
5 Claims. (Cl. 62—285)

This invention relates to air conditioning evaporator assemblies and more particularly to such assemblies which include means to permit easy adjustment of their height and width to facilitate mounting in enclosures of various dimensions.

It is becoming an increasingly common practice in the air conditioning industry to combine the heating and cooling systems in the same duct work. The evaporator coils for the cooling system are remotely located from the compressor-condenser assembly and are usually placed in the plenum chamber above the furnace or otherwise located in the air circulating duct work for the building.

An evaporator arrangement particularly well suited for the above type combined heating and cooling system comprises a pair of evaporator units connected together to form either an A or V shaped assembly. Difficulties arise in mounting such evaporator coil assemblies in plenums or duct work of the various sizes found throughout the industry. Some plenums or duct work are relatively narrow, others relatively wide, thus necessitating spacing of the evaporator coils accordingly. Presently, each A or V shaped evaporator coil assembly is custom built to fit the size of the specific enclosure in which it is to be installed.

An object of this invention is to provide novel air conditioner evaporator assemblies comprising a pair of evaporator coils to permit ready adjustment of the coils in relation to each other so as to vary the height and width of the assembly whereby it may be quickly adapted to fit in suitable enclosures of different sizes.

Another object of this invention is to provide a novel adjustable spacing means at the top and base of a pair of inclined standing evaporators, the evaporators forming either an A or V shaped assembly as desired.

Other objects and advantages of the invention will become apparent from the following detailed description and drawings in which:

FIGURE 1 is a side elevation of an A-frame evaporator coil assembly of this invention wherein the top and base of the evaporator coils forming the assembly are in an extended position;

FIGURE 2 is a side elevation of the A-frame assembly of FIGURE 1 with the top and base of the evaporator coils closer together so the entire assembly can be accommodated in a plenum of minimum width;

FIGURE 3 is a perspective view of an A-frame evaporator coil assembly illustrating another embodiment of this invention; and

FIGURES 4, 5, 6 and 7 are side elevations illustrating diagrammatically other embodiments of a V-frame evaporator coil assembly.

Referring now more specifically to the drawings, there is illustrated in FIGURES 1 and 2 an A-frame evaporator assembly indicated generally at 10 comprising a pair of conventional air conditioning coil assemblies 12 and 14. The assembly includes an expansion valve 16, a liquid refrigerant supply connection 18 and a gas return outlet connection 20. Other conventional components such as distributor tubes and equalizer tubes have been omitted from the drawing. Such tubes are of light flexible construction to permit relative movement between coils 12 and 14.

A pair of drip pans 22 and 24 having drain outlets 26 and 28, respectively, are pivotally mounted at the lower

ends of coils 12 and 14 by hinges 30 and 32 respectively. Extending between the coils 12 and 14 at each end of the base thereof are expansible and contractible braces indicated generally at 34. Each brace comprises a pair of opposed substantially aligned arms 36 and 38 having adjacent ends in sliding engagement with each other, and with their opposite ends rigidly connected by welds or other suitable means to drip pans 22 and 24 respectively. Arms 36 and 38 have elongated longitudinal slots 40 and 42 respectively, which have portions in register with each other as the arms are moved for adjustment. A bolt 44 extends through the slots 40 and 42 for tightly clamping arms 36 and 38 together in fixed relation to clamp the lower ends of coils 12 and 14 at a desired spacing. Arms 36 and 38 may be of any suitable cross sectional configuration such as L-shaped, flat, U-shaped, tubular to provide an adjustable expansible and contractible brace. The brace assembly (not shown in FIGURES 1 and 2) provided on the opposite side of the evaporator assembly 10 is identical to the brace illustrated and described.

The upper ends of coils 12 and 14 are connected in spaced relation by a pair of flat plates 46 and 48 pivotally connected together by hinge 50 and rigidly connected to the coils 12 and 14 by bolts 52. Plates 46 and 48 are provided with additional spaced holes 54 adapted to receive bolts 52 should it be desirable to space the upper ends of coils 12 and 14 more closely adjacent the pivot point of hinge 50 as shown in FIGURE 2 where the upper and lower ends of coils 12 and 14 are spaced together as closely as the plates 46 and 48 and brace 34, respectively, will allow. If desired, the excess portions of plates 46 and 48 extending beyond the coils 12 and 14 respectively, when in such an adjusted position, may be cut off to provide a neater appearance as shown in FIGURE 2.

From a comparison of FIGURES 1 and 2, it is readily apparent that the spacing between coils 12 and 14 may be varied to provide a wide base and low height assembly 10 as shown in FIGURE 1 to one having a narrower base and greater height as shown in FIGURE 2. Through the structure illustrated and described, it is possible to quickly adjust the width and height dimensions of the assembly 10 at the installation site so that it may be readily mounted in existing duct work, plenums or the like.

Referring now to FIGURE 3, there is illustrated another embodiment of this invention comprising an A-frame evaporator assembly indicated generally at 60 comprising a pair of coil assemblies 62 and 64 having drip pans 66 and 68, respectively, rigidly connected at the lower ends thereof as by welds or other suitable means. Each of the drip pans 66 and 68 have drain outlets 70 and 72 respectively. The base ends of coils 62 and 64 are adjustably connected in spaced relation from each other by expansible and contractible braces 74 each comprising an arm 76 rigid with drip pan 66 and an arm 78 rigid with drip pan 68. Both the arms 76 and 78 have a U-shaped channel cross section in sliding nesting engagement with each other and elongated longitudinal slots 80 and 82, respectively, which have portions in register with each other as the arms are moved for adjustment. Bolt 84 extends through the slots 80 and 82 for tightly clamping the arms 76 and 78 together at a desired position whereby the lower ends of coils 62 and 64 are spaced from each other a desired distance.

Connecting corresponding upper ends of coils 62 and 64 in spaced relation from each other is a rigid V-shaped bracket plate 86 having mounting sections 88 and 90 in which there are provided spaced holes 92 for receiving bolts 94 whereby the coils 62 and 64 may be spaced outwardly as shown or more closely together in a position adjacent the intersection of plates 88 and 90.

With a rigid bracket plate such as 86, and with no pivotal connection between the drip pans and evaporators, the inclination and height of the coils 62 and 64 remain the same in all adjusted positions.

Referring now to FIGURE 4, there is illustrated still another embodiment of this invention wherein a V-frame assembly indicated generally at 100 comprising a pair of coils 102 and 104 are pivotally mounted to the sides of drip pans 106 and 108 by hinges 110 and 112 respectively. The drip pans 106 and 108 are pivotally connected together by a hinge 114. Accumulated drip water from the coils is shown at 115, it being preferred however that the water be disposed of through the usual drain connections. The outer lower edges of coils 102 and 104 are supported in adjustable spaced relation above the bottom of drip pans 106 and 108 by struts 116 and 118 respectively, of any suitable length, abutting against a suitable supporting edge of the evaporators. The struts 116 and 118 are fixedly held in position by any suitable means such as screws (not shown).

Upper ends of the coils 102 and 104 are spaced from each other by an adjustable expansible and contractible brace 120 pivotally connected at opposite ends thereof to the coils 102 and 104 as by pins indicated at 122 and 124, respectively. The brace 120 may be of any suitable construction such as that shown in FIGURES 1–3. With such a construction, the same pans can function over a wide range of positions and dimensional variations and the evaporators may be used in either an A or V position by the use of hinges in locations as indicated.

Referring now to FIGURE 5, there is illustrated another embodiment of the invention wherein a pair of coils 132 and 134 are pivotally mounted by hinges 136 and 138 on upright support brackets 140 and 142, respectively, in turn rigidly mounted in the bottom of a unitary drip pan 144 having a flat bottom surface. The outer lower edges of coils 132 and 134 are spaced from the bottom of drip pan 144 by struts 146 and 148, respectively, in the same manner as shown in FIGURE 4. Upper ends of coils 132 and 134 (not shown) are adjustably connected together by a suitable expansible and contractible bracing arm (not shown) in the same manner as shown in FIGURE 4.

Illustrated in FIGURE 6 is still another embodiment of this invention which is identical with that shown in FIGURE 5 except that a drip pan 150 having an inverted V-shaped bottom is substituted for the drip pan 144. Coils are indicated at 152 and 154, hinges at 156 and 158, brackets at 160 and 162, and struts at 164 and 166 respectively, all of which function in the same manner as the like members shown in FIGURE 5.

The V-frame arrangement may also be achieved utilizing the basic components of the unit of FIGURES 1–3. Such a modification is shown in FIGURE 7. In this arrangement the drip pans 22 and 24 are positioned in back-to-back relation by braces 170 and 172. The brace 170 also supports the hinge 50 of the plates 46 and 48 which in this form of the invention support the coil assemblies 12 and 14 in inverted position. The relative angularity of the coils is determined by the height of the support blocks 174 and 176 which engage the outer edge of the plates 46 and 48.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. For example, while the coils 12, 14, 62, 64, 102, 104, 152 and 154 have been referred to as evaporator coils, they may be condenser coils or other forms of heat exchange apparatus. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. A heat exchanger comprising a pair of generally vertically extending coils each having upper and lower ends, a hinge construction connecting the adjacent ends of said coils to permit the opposite ends to be variably spaced, adjustable means connected to said opposite ends of said coils to determine the spacing therebetween, and drip pans mounted on each of said coils adjacent the respective lower ends thereof, said drip pans being disposed directly beneath said lower ends of said coils in all positions thereof.

2. A heat exchanger comprising a pair of generally vertically extending coils each having upper and lower ends, a pair of plates mounted respectively on the upper ends of said coils, a hinge construction connecting said plates whereby said coils may be swung about said hinge connection to adjustably space the lower ends thereof, drip pans hingedly connected to the respective lower ends of said coils whereby said drip pans may be maintained in substantially horizontal position directly beneath the lower ends of said coils in all positions of said coils, adjustable brace means connected to said drip pans to determine the spacing between said lower ends of said coil, and means for clamping said brace means in any desired adjusted position.

3. A heat exchanger comprising a pair of spaced coil assemblies arranged in A-form, means connecting the upper ends of said coil assemblies and permitting the adjustable spacing of the lower ends of the coil assemblies from each other, drip pans pivotally mounted on each of said coil assemblies adjacent the lower end thereof, an expansible and contractible brace having the opposite ends thereof rigidly connected to said drip pans and extending therebetween, and means to maintain said brace at a desired length.

4. The heat exchanger of claim 3 in which the means connecting the upper ends of said coil assemblies is a hinge.

5. A heat exchanger comprising a pair of spaced coil assemblies arranged in the form of an upwardly opening, drip catching means mounted on the lower ends of said coil assemblies, means pivotally connecting said lower ends of said coil assemblies, an expansible and contractible brace having opposite ends thereof connected to the upper ends of said coil assemblies and extending therebetween, and means to maintain said brace at a desired length.

References Cited in the file of this patent

UNITED STATES PATENTS

2,040,947	Mojonnier	May 19, 1936
2,042,420	Askin	May 26, 1936
2,446,876	Iwashita	Aug. 10, 1948
2,708,833	Nigro	May 24, 1955
2,722,266	Kersten	Nov. 1, 1955