

Sept. 22, 1936.

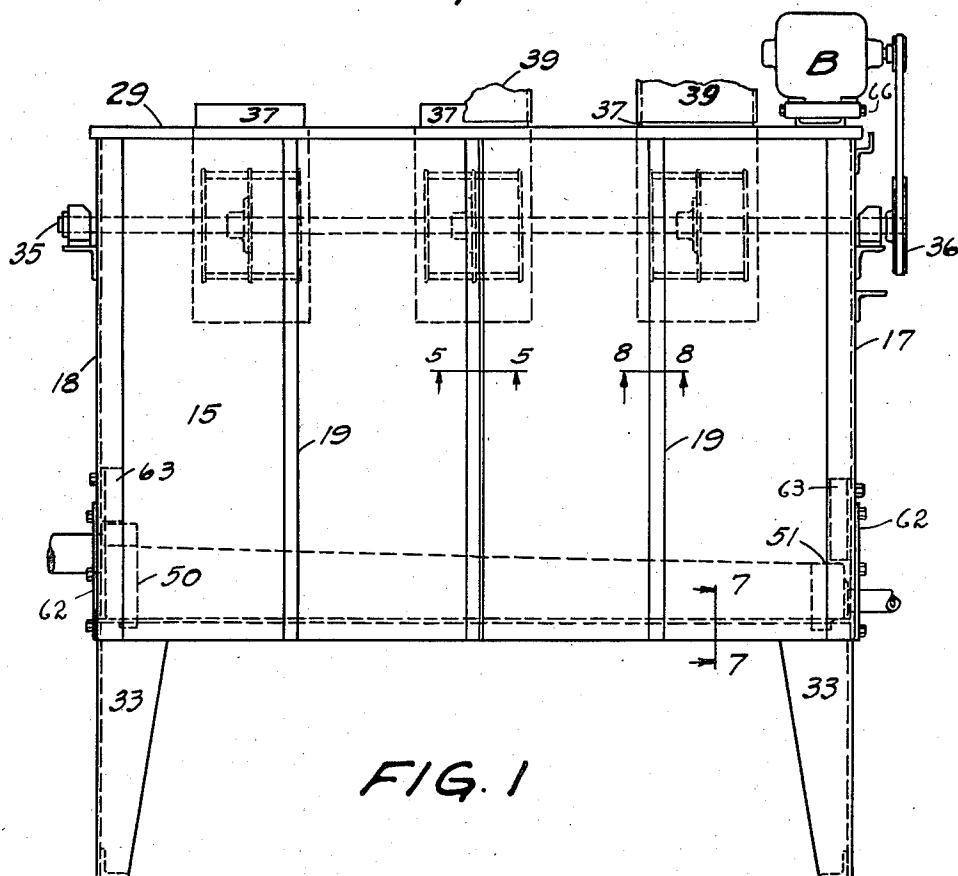
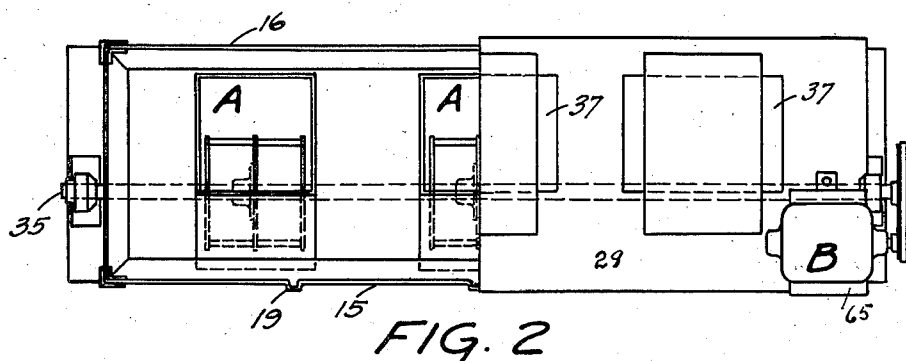
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2,055,056

UNIT AIR CONDITIONER

Filed Aug. 12, 1935

4 Sheets-Sheet 1



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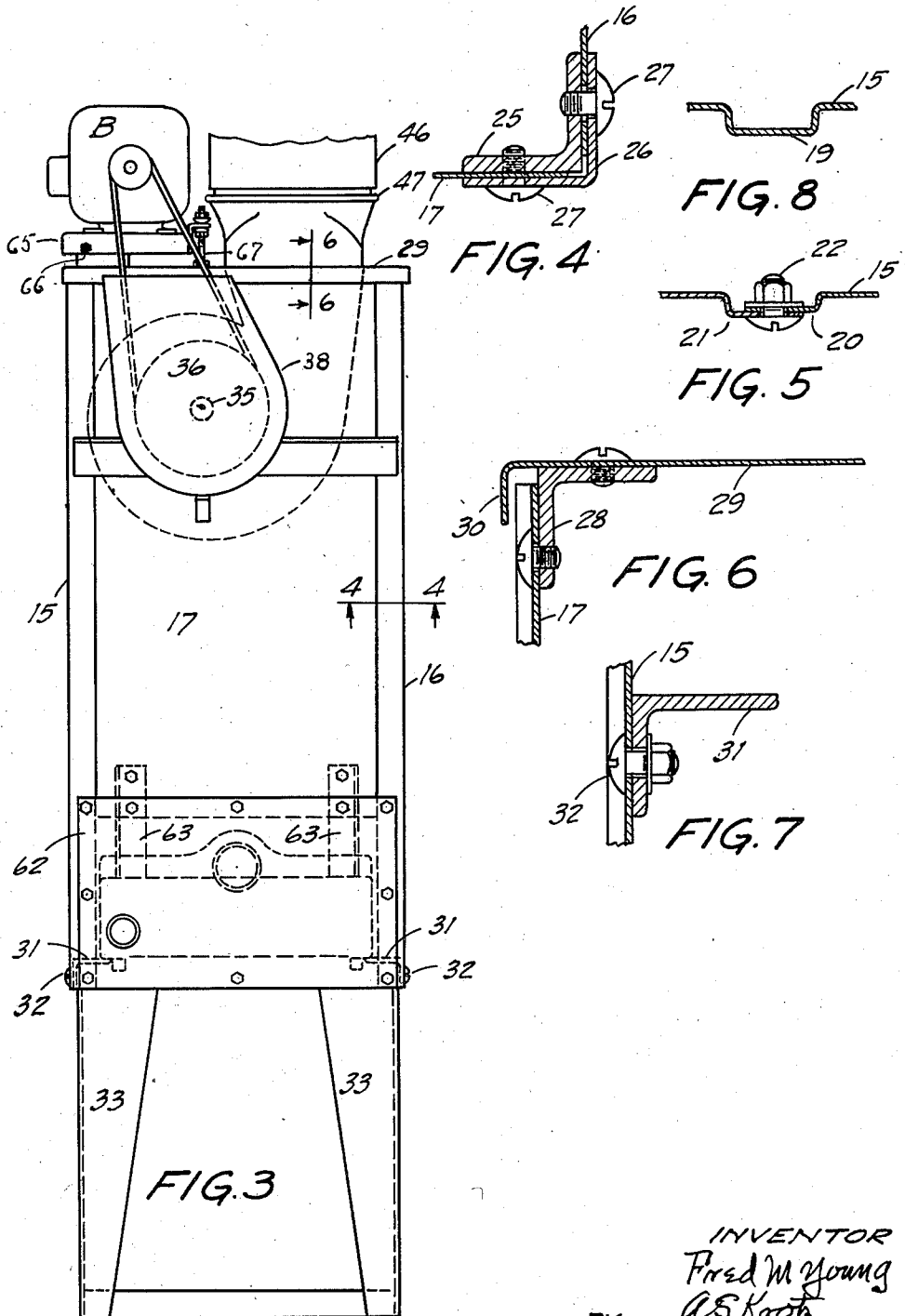
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UNIT AIR CONDITIONER

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UNIT AIR CONDITIONER

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4 Sheets-Sheet 3

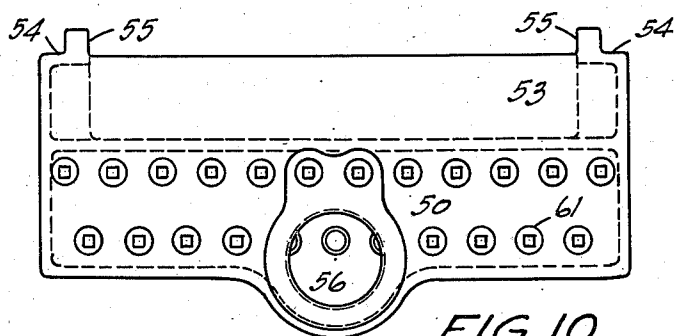


FIG. 10

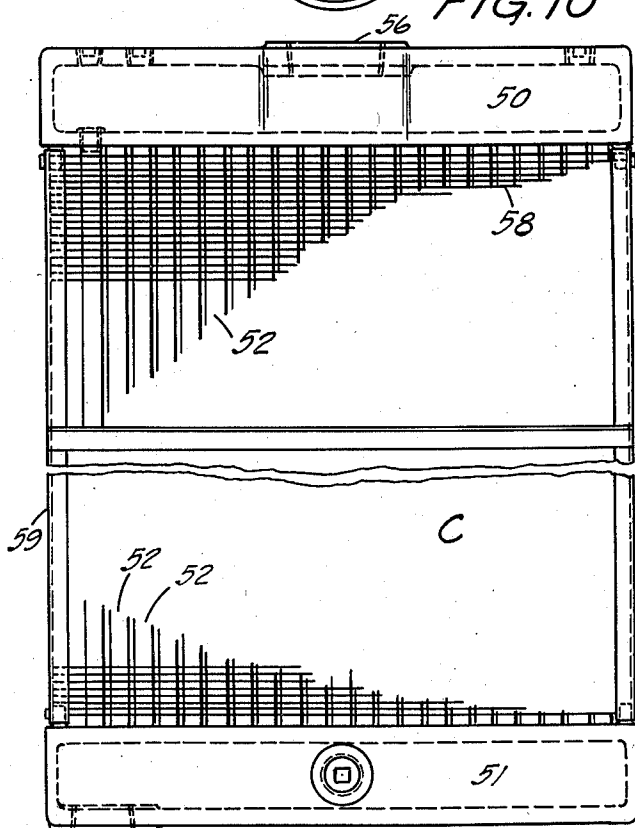


FIG. 11

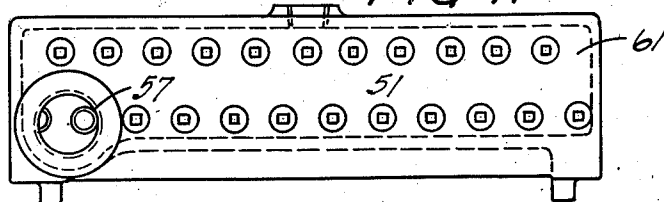


FIG. 12

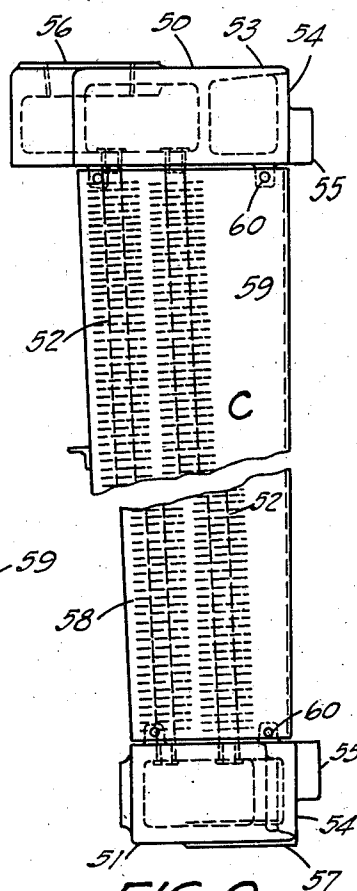


FIG. 9

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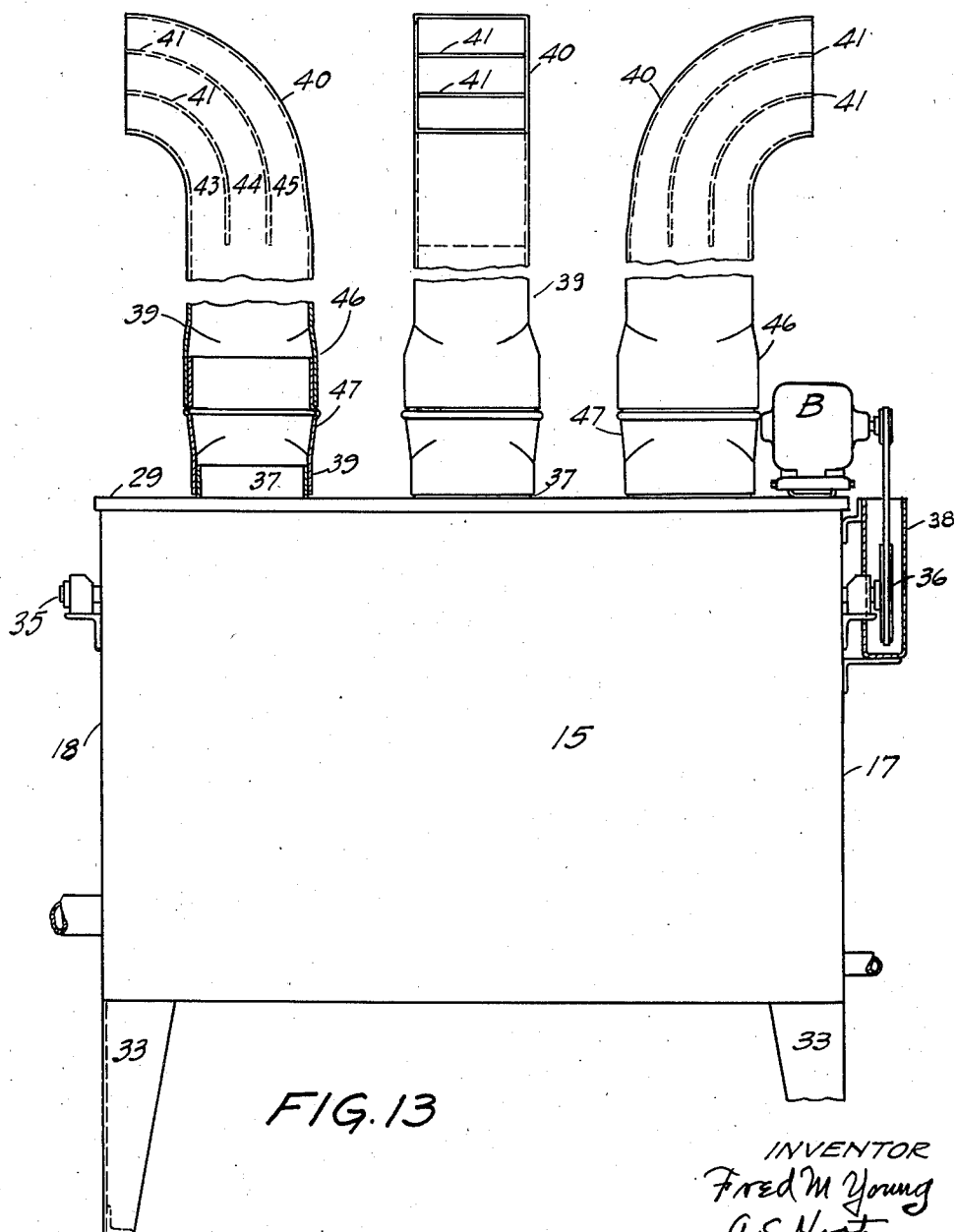
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UNIT AIR CONDITIONER

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,055,056

UNIT AIR CONDITIONER

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Application August 12, 1935, Serial No. 35,739

6 Claims. (Cl. 257—137)

My invention relates to improvements in air conditioners, more particularly those adapted to be positioned in the room served and having means whereby the air is recirculated and heated or cooled.

One of the objects of my invention is to provide means whereby the heating or cooling core may be easily removed or replaced and whereby the liquid in the core is gravity drained.

Another object of my invention is to provide air delivery means whereby the air is economically delivered from vertical to horizontal in any desired direction.

A further object is to provide a novel core and supporting means whereby the complete unit may be safely transported and installed, and whereby free expansion and contraction is provided for.

Another object is to provide a neat, economically manufactured and easily assembled or disassembled housing.

To these and other useful ends my invention consists in matter hereinafter set forth and claimed and shown in the accompanying drawings in which:

Figure 1 is a front elevation of a complete unit showing a fraction only, of the air delivery tubes.

Figure 2 is a top view of the complete unit as illustrated in Figure 1, a portion of the cover being removed.

Figure 3 is an end elevation of the unit as illustrated in Figure 1.

Figure 4 is a fractional section of the corner structure taken on line 4—4 of Figure 3.

Figure 5 is a fractional section taken on line 5—5 of Figure 1.

Figure 6 is a fractional section taken on line 6—6 of Figure 3.

Figure 7 is a fractional section taken on line 7—7 of Figure 1.

Figure 8 is a fractional section taken on line 8—8 of Figure 1.

Figure 9 is a side elevation of one form of a heating core.

Figure 10 is an inlet end view of the core as illustrated in Figure 9.

Figure 11 is a top view of the core shown in Figure 9.

Figure 12 is an outlet end view of the core shown in Figure 9.

Figure 13 is a front elevation of the unit illustrating my improved air distributing outlets.

As thus illustrated the unit, for convenience, is shown as being served by three fans, preferably of the cage type, each designated in their

entirety by reference character A. These fans are operatively connected to motor B in a manner which will hereinafter appear.

I provide a rectangular housing, vertically disposed and comprising a front wall 15 and a rear wall 16. The end walls are designated by numerals 17 and 18. I provide vertically positioned stiffening ribs 19 in the walls 15 and 16 as illustrated. In wide units, walls 15 and 16 are made in two or more pieces, which are joined together as indicated in Figure 5, wherein the raised edges 20 and 21 overlap one over the other and are secured together by means of a suitable number of bolts 22.

The side and end walls are, at their corners, joined together by means of angle irons 25, and cover member 26. This assembly is securely held together by means of bolts 27. The top edges of the walls are secured to angle irons 28, which also act as a support for the lid 29, the lid having downwardly projecting edges 30, thus to stiffen the lid and improve the appearance of the assembly.

The bottom edges of walls 15 and 16 are securely attached to angle irons 31—31, by means of a suitable number of bolts 32. Suitable side angles are provided for end walls 17 and 18. Suitable supporting legs 33 are provided whereby air may pass into the bottom of the cabinet, as will hereinafter appear.

The fans A are, preferably, attached to and supported by lid 29, or they may be supported by angle irons which will also act as a lid support. The fan rotors are supported and driven by shaft 35. This shaft is rotatably supported by suitable bearings, one end projecting so as to carry a pulley 36, having a suitable belt connection to motor B.

Each fan A is provided with an outlet opening 37, through lid 29; thus when the motor B is in operation, room air will pass into the bottom of the cabinet and out at these outlets.

Whether the recirculated air is heated or cooled, it is desirable to discharge the air horizontally near the ceiling and frequently, in different directions. I provide means whereby the air is economically diverted from a vertical to a horizontal direction and whereby the discharge outlet may be turned in any direction as follows:

Necessarily outlet 37 is either square or rectangular in cross section. I provide, preferably, square tube risers 39, each having an elbow 40 at their free ends. Each curve or elbow is, preferably, provided with one or more transverse partitions 41, these partitions extending from the out-

let end of the elbow to a short distance below the beginning of the bend; thus as illustrated the air leaves the vertical riser 39, and equal quantities will enter the three spaces 43, 44, and 45 and continue to the outlet in equal quantities, whereas without partitions 41, the rapidly moving air would be forced centrifugally against the outer wall of the elbow and be inefficiently moved and discharged into the room.

I provide a rounded portion 46 which telescopes over a rounded sleeve 47. The elbow 40 may thus be turned in any desired direction.

In Figure 13, I illustrate the end elbows as pointing outwardly and the center as pointing forwardly. A unit having four fans may be positioned in the center of the room and the outlets pointed oppositely. The air may thus be discharged in opposite directions or the outlets may be moved to whatever position is best suited to the installation.

Referring now to Figures 9, 10, 11 and 12, wherein I illustrate a heat transfer core adapted for steam heating. This core is provided with an inlet header 50 and an outlet header 51. A suitable number of tubes 52 are operatively secured at their end to the headers, as illustrated. The inlet ends are held considerably higher than the outlet ends by means of a header extension 53, the two headers being adapted to lie on angle irons 31 as at 54. The lugs 55 are positioned to act as a transverse guide between members 31; thus the core C will be free to slide endwise on its supports. Clearly lugs 55 will also contact the angle irons at the end of the cabinet similarly, preventing excessive end movement.

Header 50 is provided with a threaded inlet opening 56, and header 51 is provided with a threaded outlet 57. Closely spaced fins 58, through which the tubes extend are provided. Side housing members 59—59 are attached to the headers as at 60, thus to provide a suitable spacing member for the headers and protect the fin edges from injury during manufacture and assembling operations.

It will be noted that the lower edge of members 59 parallel supporting members 31 and are in juxtaposition thereto; thus air will be prevented from passing over the top of members 31 and between members 59 and the side wall of the cabinet.

It will be seen that screw plugged openings 61 register with the unexposed ends of the tubes, thus the tube ends may be expanded and suitable reinforcing sleeves may be inserted and expanded in the tube ends, after which these openings are closed by suitable plugs.

By referring to Figure 3, it will be noted that I provide removably attached plates 62. The openings covered by these plates have a greater width and length than the width and height of either header, whereby the core C may be lifted slightly and moved in either direction into and out of the cabinet, drawer like. In some installations one only of these openings need be supplied. I prefer, however, two openings, thus to provide a single design suitable for any installation.

I provide holding down members 63—63, each attached to their respective end wall, the lower ends resting on their respective headers. If it is desired to remove the core in the direction of the header 50, these holding down members need not be disturbed; but if the core is to be removed in direction of header 51, then one bolt of each member only adjacent header 51 need be removed

and the members 63 swung sidewise so header 50 will pass thereunder.

As thus illustrated and described it will be seen that core C is easily removed in either direction, and that a cooling coil may be easily substituted at the end of the cold season or another coil for cooling, permanently provided and positioned between core C and fans A, and supported in the same manner as core C.

It will be seen that I provide a base 65 for motor B having a pivotal support at one end as at 66. The other end of the base is adjustably supported by screw threaded bolt 67. The base 65 may thus be rocked on pivot 66 to thereby adjust the tautness of the belt. It will also be seen that I provide a shield 38 with which to cover the belt and pulley for a safe distance above the floor. The shield 38 is shown in section in Figure 13, and its supporting brackets only, are shown in Figure 1.

Clearly applicant's device can be advantageously positioned in the room served because of the adjustable outlets 40 and the air will be equally distributed in the spaces 43, 44 and 45.

The housing structure, illustrated, obviously is simple, strong, and neat in appearance and particularly adapted to the purpose for which it was designed.

Having thus shown and described my invention I claim:

1. An air conditioner of the class described, comprising a cabinet rectangular in horizontal section having means to force air therethrough, a heat transfer core having inlet and outlet headers and a number of operatively connected tubes therebetween, a multiplicity of closely spaced fins through which said tubes extend, two horizontally positioned frame bars extending the length of said cabinet and attached to the inside lower edge of the two side walls forming a reinforcement therefor, said core adapted to fill the air path of said cabinet, the headers at their ends being adapted to slidably rest on said bars, an opening in an end wall of said cabinet having a detachable cover and positioned whereby said core may be inserted or removed through said opening drawer like.

2. A device as in claim 1 and further comprising, depending guiding lugs on said headers contacting the inner edges of said bars and thereby limiting the side movement of said core.

3. A device as in claim 1 and further comprising, the supporting means on said inlet header depending therefrom whereby said tubes will extend downwardly toward the outlet header.

4. A device of the class described, comprising a rectangular in cross section, vertically positioned cabinet having means for moving air therethrough, horizontal frame bars secured to the side panels of said cabinet for the length thereof, a heat transfer core comprising inlet and outlet headers, a number of tubes operatively connecting said headers and having a multiplicity of fins through which they extend, side plates connecting corresponding ends of said headers forming a frame, said headers at their ends adapted to rest on said frame bars, said inlet header having depending supports adapted to position the header above the plane of said outlet header, the lower edge of said plates paralleling said frame bars and in juxtaposition thereto.

5. A device of the class described, comprising a rectangular in cross section, vertically positioned cabinet having means for moving air

therethrough, horizontal frame bars secured to the side panels of said cabinet for the length thereof, a heat transfer core comprising inlet and outlet headers, a number of tubes operatively connecting said headers and having a multiplicity of fins through which they extend, side plates connecting corresponding ends of said headers forming a frame, said headers at their ends adapted to rest on said frame bars, said inlet header having depending supports adapted to position the header above the plane of said outlet header, the lower edge of said plates paralleling said frame bars and in juxtaposition thereto, the end panels of said cabinet each having a detachable plate suitably positioned whereby said core may be removed and replaced, drawer like, from either direction.

6. A device of the class described, comprising a rectangular in cross section, vertically positioned cabinet having means for moving air therethrough, horizontal frame bars secured to

the side panels of said cabinet for the length thereof, a heat transfer core comprising inlet and outlet headers, a number of tubes operatively connecting said headers and having a multiplicity of fins through which they extend, side plates connecting corresponding ends of said headers forming a frame, said headers at their ends adapted to rest on said frame bars, said inlet header having depending supports adapted to position the header above the plane of said outlet header, the lower edge of said plates paralleling said frame bars and in juxtaposition thereto, the end panels each having a detachable plate suitably positioned whereby said core may be removed and replaced, drawer like, from either direction, said headers at their supports having depending lugs positioned to loosely contact the inner edge of said bars and thereby hold said core in a central position.

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