

Dec. 17, 1963

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3,114,307

INDUCTION CIRCULATOR TUBE MEANS ASSEMBLY

Filed April 19, 1962

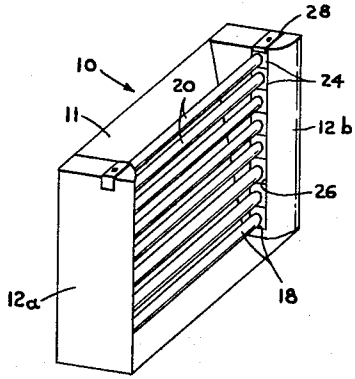


FIG. 1

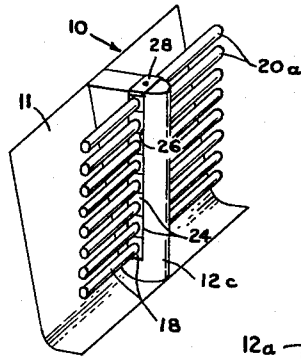


FIG. 2

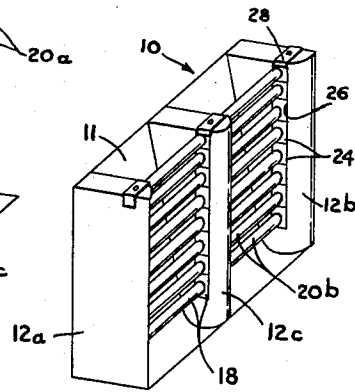


FIG. 3

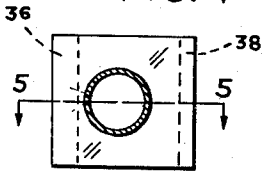


FIG. 4

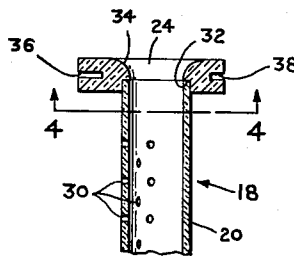


FIG. 5

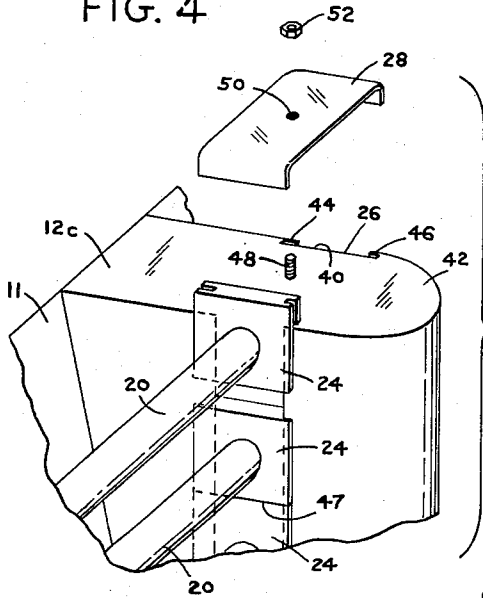


FIG. 6

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INDUCTION CIRCULATOR TUBE MEANS ASSEMBLY

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Filed Apr. 19, 1962, Ser. No. 188,823
4 Claims. (Cl. 98—38)

This invention relates generally to induction circulators. More particularly the invention relates to the assembly of the induction circulator tube means.

The assembly of the tube means of the induction circulators in the prior art required exact fitting thereof thus taking much time. Furthermore, if this fitting was or became defective the result was leakage of the primary air and a resulting drop in efficiency.

It is the object of the present invention to overcome the disadvantages of the prior art and to prevent loss of efficiency in the induction circulators by providing a novel assembly of the present invention.

In accordance with the present invention of operably assembling an induction circulator having primary air delivered therefrom there is provided

- (a) a plenum having slot means therein,
- (b) a plurality of tube means disposed in said slot means in leak proof relationship therewith,
- (c) cover means connected to said plenum and adapted to press said tube means against each other to prevent leakage therebetween,
- (d) said tube means having openings along the length thereof for the discharge of primary air therefrom.

One of the objects of this invention is to provide an induction circulator which is constructed to operate efficiently while maintaining a basic simplicity in design.

Another object of this invention is to provide a plurality of tube means which can be slidably disposed in the plenum in leak proof relationship therewith.

Another object of this invention is to provide cover means which prevent leakage between the tube means.

Still another object of this invention is to provide slot means in the plenums in which the tube means can be slidably disposed.

Still another object of this invention is to provide an induction circulator which cannot be misassembled and whose assembly can be accomplished in a quick and simple manner.

With these and other objects in view as may appear from the accompanying specification the invention consists of various features of construction and combination of parts which will be first described in connection with the accompanying drawings which show the preferred form of the induction circulators and the features forming the invention will be specifically pointed out in the claims.

In the drawings:

FIGURE 1 is a perspective view of the preferred form of the induction circulator embodying this invention.

FIGURE 2 is a perspective view of a modified form of the induction circulator embodied in the invention.

FIGURE 3 is a perspective view of still another modified form of the novel induction circulator.

FIGURE 4 is a view taken at line 4—4 of FIGURE 5.

FIGURE 5 is a view taken at line 5—5 of FIGURE 4.

FIGURE 6 is an exploded partial view of the novel induction circulator.

Referring more particularly to the drawings FIGURE 1 shows the preferred form of the induction circulator designated generally as 10. Only the rear of the casing 11 is shown but it will be understood that any suitable casing can be used for the induction circulator 10. In the preferred form there is a plenum designated generally as 12 (the left plenum is indicated as 12a and the right

plenum as 12b), tube means 18 which includes tubes 20 and holder element 24 which is disposed in the slot means 26 of the plenums 12a and 12b and cover element 28 which is connected to the plenums 12a and 12b and which maintains the induction circulator in operative assembly.

FIGURES 2 and 3 show modified forms of the induction circulator 10 and in which a plenum 12c is used both with and without the plenums 12a and 12b. Note that when the plenum 12c is used alone the tubes 20a have one end closed and that they are cantilevered from plenum 12c. When plenums 12a, 12b and 12c are combined the tubes 20b will generally be of a shorter length than the tubes 20. Otherwise the assembly of the induction circulator 10 is the same and will be more fully described hereinafter.

It is understood that the number of plenums, the length and arrangement of the tubes and their positioning in the induction circulator 10 could be modified over a wide range and still be within the scope of this invention.

As illustrated in FIGURES 4 and 5 tube means 18 comprise tubes 20 and holder element 24 and tubes 20 have openings 30 therein. Openings 30 can be positioned as desired but it is preferred that they are in the rearward facing half of the tubes 20 so as to induce a maximum quantity of secondary air through the heat exchange means (not shown) on primary air exiting therefrom.

Tube 20 is disposed into recess 32 of holder element 24 and fixedly connected thereto on the side thereof opposite the enlarged smooth opening 34. The holder element has a large groove 36 on the rearward side thereof and a small groove 38 on the frontward side thereof. The purpose of the unequal uniform grooves 36 and 38 will be explained hereinafter.

The material used for the tubes 20 can be metal or plastic while it is preferred that the holder element 24 be made of a softer material such as rubber or plastic.

To accommodate the holder element 24 plenum 12 has an opening 40 in the top 42 thereof which is in superposition to the slot means 26. The plenum 12c is shown in FIGURE 6 but it will be understood that the construction is the same for the plenums 12a and 12b. Large fin 44 is formed along the length of the slot means 26 on the rearward side and extends therein. Small fin 46 is also formed along the length of the slot means 26 on the outward side and extends therein. The length of the fins 44 and 46 correspond to the depth of the grooves 36 and 38 respectively. When holder element 24 is disposed into the opening 40 the fins 44 and 46 are disposed into the grooves 36 and 38 respectively. Due to the difference in size of the respective fins and grooves it is impossible to misassemble them. This is important because the tube openings 30 are positioned for maximum induction and therefore they are usually facing rearwardly. However, if the tube means 18 is installed backwards the result would be that the openings 30 face forwardly thus sharply reducing the inductive efficiency of the induction circulator 10 because primary air is exiting to prevent the induction of secondary air.

Furthermore, in this way the tube means 18 cannot be installed incorrectly whether they have a holder element 24 at one or both ends. This is so because if there is a choice of a right or left assembly as, for example, that shown in FIGURES 2 and 3 all that is required is to flip the tube means 18 over and it is adapted for right or left installation.

Tube means 18 are stacked into slot means 26 and the overlapping tongue and groove fit of the respective fin and grooves prevent leakage of primary air therebetween. To insure that no primary air leaks through the joints 47 of stacked tube means 18 cover element 28 is disposed to hold them in assembled position and to press the holder elements 24 against each other thus preventing leakage

therebetween. Plenum 12 has a stud 48 affixed thereto and when the cover element 28 is positioned the stud 48 extends through hole 50 and is adapted to threadedly receive nut 52 which secures the cover element 28 in assembled position.

It will be understood that this invention is not to be limited to the specific construction or arrangement of parts shown but that they may be widely modified within the invention defined by the claims.

What is claimed is:

1. An induction circulator comprising:

- (a) a casing,
- (b) a plenum connected to the casing,
- (c) the plenum having an opening which defines a slot,
- (d) the slot extending substantially the length of the plenum,
- (e) a pair of fins formed along the length of the slot on either side thereof and with one of the fins extending into the slot a greater distance than the other,
- (f) a plurality of holder elements slideably disposed in the opening of the plenum and extending the length of the slot means in sealed engagement with each other along the side thereof transverse to the pair of fins,
- (g) the sides of each of the holder elements extending in the direction of the length of the slot having groove means formed therein into which the fins extend into whereby each of the holder elements straddles each of the fins in sealed relationship therewith,
- (h) cover means connected to the plenum to press the holder elements against each other to prevent leakage therebetween,

(i) a tube element connected to each of the holder elements in communication with the plenum and extending in a horizontal plane outwardly therefrom,
 (j) a plurality of openings formed in each of the tube elements on the side thereof adjacent one of the fins whereby all the openings face in the direction of said fin.

2. The combination claimed in claim 1 wherein:

- (a) the grooves on the sides of the holder elements formed of unequal depth corresponding to the unequal extension of the fins,
- (b) all the openings in each of the tube elements formed on the side thereof adjacent the same one of these grooves whereby on assembly all of the openings will face in the same direction.

3. The combination claimed in claim 2 wherein:

each of the openings formed in the tube elements on the side thereof adjacent the deeper groove so that on assembly of the induction circulator all of the openings in the tube elements will face in the direction of said deeper groove.

4. The combination claimed in claim 1 wherein:

- (a) the slot in spaced relationship with the connection between the plenum and the casing,
- (b) the openings in the tube elements facing in the direction of the fin located closest to the connection between the plenum and the casing.

References Cited in the file of this patent

UNITED STATES PATENTS

1,598,634	Wolf	Sept. 7, 1926
2,484,769	Wolters	Oct. 11, 1949
2,987,985	Johnson	June 13, 1961