Title: SNAP ITT EVAPORATOR ORIHCE

Abstract: An air conditioner assembly (10) includes a partition (28) defining an opening (30) that corresponds with a blower (18) to provide the desired air flow. Air flow generated by the blower (18) provides for desired operation of the air conditioner assembly (10). The opening (30) includes an orifice (34). The orifice (34) attaches to the partition (28) and cooperates with the blower (18) to produce the desired air flow. The orifice (34) includes three tabs (42, 46, 50) that extend from a circumference to engage corresponding slots (44, 48, 52) defined on the partition (28). At least one of the tabs (42, 46, 50) includes a locking feature to prevent removal of the orifice (34) from the partition (28). The locking feature (54) is hidden on an inner surface of the slot (44) to inhibit disassembly during maintenance or other service.
"SNAP FIT EVAPORATOR ORIFICE"

FIELD OF THE INVENTION

This invention generally relates to a blower casing for an air conditioner. More particularly, this invention relates an orifice including attachment features that prevent for preventing disassembly.

DESCRIPTION OF THE RELATED ART

An air conditioner includes a blower for circulating air through the various components. The efficiency of the air conditioner is largely dependent on the efficiency at which the blower circulates air. To increase blower performance a larger motor can be utilized. However larger motors consume more power and are therefore not a desirable alternative. The flow path through which air flow driven by the blower can be designed to increase air flow without a larger motor. The design of an increased efficiency air flow path can require complex geometric shapes. The complex geometric shapes are often not easily produced as one piece and therefore require several parts that are attached to one another to form the desired airflow path.

Routine servicing of the air conditioner during its operational life can require partial disassembly of internal components. Disassembly of the several parts that define the desired airflow path is not necessary during service. However, during such service, parts that appear as though they may be disassembled may be taken apart, even though not necessary. Further, once taken apart, it is possible that these parts may be assembled incorrectly or not reassembled at all. Such a failure to
correctly reassembly the various airflow components can impact the desired operational performance of the air conditioner.

Accordingly, it is desirable to design and develop an assembly method and device that deters disassembly during maintenance.

SUMMARY OF THE INVENTION

A disclosed example air conditioner assembly includes an orifice attached to a partition in a manner that is not recognizably removable.

The example air conditioner assembly includes a partition defining an opening that corresponds with a blower to provide the desired air flow. Air flow generated by the blower provides for desired operation of the air conditioner assembly. The opening includes an orifice. The orifice attaches to the partition and cooperates with the blower to produce the desired air flow. The orifice includes an outer rim that attaches to a front surface of the partition. A flow surface extends from the outer rim, through the opening and into the compartment. The flow surface includes a shape defined to provide beneficial air flow characteristics.

The orifice includes three tabs that extend from a circumference to engage corresponding slots defined on the partition. Assembly to the partition is accomplished by inserting the orifice into the opening and rotating the orifice such that the tabs are received within the corresponding slots. One of the tabs includes a locking feature to prevent removal of the orifice from the partition. The locking
feature is hidden on an inner surface of the slot to inhibit disassembly during maintenance or other service.

Accordingly, the example orifice is securable to the partition in a manner that substantially prevents removal during service or other maintenance. The hidden locking feature prevents rotation in a direction that would allow removal of the orifice while not being recognizable as an attachment feature to dissuade removal.

The various features and advantages of this invention will become apparent to those skilled in the art from the following detailed description of the currently preferred embodiments. The drawings that accompany the detailed description can be briefly described as follows.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 is an exploded view of an example air conditioner assembly.

Figure 2 is a cross-sectional view of an example air conditioner assembly.

Figure 3 is a perspective view of an example partition and orifice.

Figure 4 is a cross-sectional view of an example joint between the partition and orifice.

Figure 5 is an enlarged view of an example tab and slot.
Figure 6 is a cross-sectional view of the example joint.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figure 1, an example air conditioner assembly 10 includes a front cover 12 and a housing 14 that covers the internal components. The air conditioner assembly 10 includes a compressor 16, a condenser 24 and an evaporator 26. A motor 20 drives a blower 18 and a fan 22. The blower 18 generates a desired air flow through the evaporator 26 and through the front cover 12. The blower 18 is disposed within a compartment defined by a partition 28. The partition 28 includes an opening 30 that corresponds with the blower 18 to provide the desired direction and magnitude of air flow. A cover 32 is attached to the partition 28 to define a top portion of the compartment.

Air flow generated by the blower 18 provides for desired operation of the air conditioner assembly 10. The blower 18 includes a plurality of vanes that cooperate with the opening 30 to push air flow out the front of the air conditioner. The better the air flow the more cool air that can be generated.

Referring to Figure 2, the opening 30 (Best shown in Figure 3) includes an orifice 34. The orifice 34 attaches to the partition 28 and cooperates with the blower 18 to produce the desired air flow. The orifice 34 includes an outer rim 36 that attaches to a front surface 27 of the partition 28. A flow surface 38 extends from the outer rim 36, through the opening 30, past a back surface 25 of the partition 28 and into the compartment. The flow surface 38 includes a shape
defined to provide beneficial air flow characteristics that improve air flow through the air conditioner assembly 10.

The flow surface 38 extends from the outer rim 36 into a position adjacent to the blower 18. The orifice 34 is attached to the partition 28 such that the flow surface 38 is positioned in a defined manner relative to the blower 18.

Referring to Figure 3, the orifice 34 and the partition 28 are shown prior to assembly. The orifice 34 includes three tabs 42, 46, and 50 that extend from a circumference to engage slots 44, 48 and 52 defined on the partition 28. Assembly to the partition 28 is accomplished by inserting the orifice 34 into the opening 30 with the tabs 42, 46 and 50 rotated away from the tabs 44, 48, and 52. Once the orifice 34 is received through the opening 30 and the outer rim 36 is seated against the partition 28, the orifice 34 is rotated as indicated by arrows A such that the tabs 42, 46, and 50 are received within the slots 44, 48, and 52. Although the disclosed example includes three tabs and three slots, more or less tabs and slots are within the contemplation of this invention.

Referring to Figures 4 and 5, the first tab 42 includes a locking feature 54 to prevent removal of the orifice 30 from the partition 28. The locking feature 54 is hidden on an inner surface of the slot 44 to inhibit disassembly during maintenance or other service. The slot 44 includes a receiving portion 60 that receives the tab 42. The initial installation of the orifice 30 causes the tab 42 to be inserted in an axial direction into the receiving portion 60. In the receiving portion 60, the tab 42
is not constrained. Rotation of the orifice 30 relative to the partition 28 slides the
tab 42 under the slot 44 to substantially hide the tab 42 from view.

The first tab 42 and slot 44 lock together to prevent rotation in a direction
opposite from the assembly direction. The other tabs 46 and 50 do not lock but
instead slide in to the corresponding slot 48, 50 to prevent axial removal of the
orifice 30. The combination of the first tab 42 and slot 44 locking together to
prevent rotation, and the other tabs 46, 50 and slots 48 52 preventing axial
movement secures the orifice 30 to the partition 28.

Referring to Figure 6, the slot 44 includes an underside surface 56 that is not
visible from the front or top of the partition 28. The underside surface 56 includes
a stop (58) for securing the tab 42 within the slot 44. The example stop comprises
an undercut 58 that receives the locking feature 54. The locking feature 54
includes a ramped surface to guide the tab 42 into the slot 44. The locking feature
54 bends the tab 44 outwardly until being received in the undercut 58. Once
received within the undercut 58 the tab 42 cannot be removed without deforming
the slot 44. Further, as the locking feature 54 is not visible from the front of the
partition 28 the orifice 30 is not recognizably removable from the partition 28.

Accordingly, the example orifice 30 is securable to the partition 28 in a
manner that substantially prevents removal during service or other maintenance.
The hidden locking feature 54 prevents rotation in a direction that would allow
removal of the orifice while not being recognizable as an attachment feature to
dissuade removal.
Although a preferred embodiment of this invention has been disclosed, a worker of ordinary skill in this art would recognize that certain modifications would come within the scope of this invention. For that reason, the following claims should be studied to determine the true scope and content of this invention.
CLAIMS

1. An air conditioner assembly comprising:
   a partition (28) including an opening (30) for air flow; and
   an orifice (34) mounted within the opening (30) for generating desired air
   flow characteristics, wherein one of the orifice (34) and the partition (28) includes a
   slot (44) and the other of the orifice (34) and partition (28) includes a tab (42)
   received within the slot (44).

2. The assembly as recited in claim 1, wherein the slot (44) includes an outer
   surface (27) and an inner surface (25) and a stop (58) disposed on the inner surface
   (25) for securing the tab (42) within the slot (44).

3. The assembly as recited in claim 2, wherein the slot (44) includes an
   undercut (58) for receiving a ridge (54) disposed on the tab (42).

4. The assembly as recited in claim 1, wherein the tab (42) is disposed on the
   orifice (34) and the slot (44) is disposed on the partition (28).

5. The assembly as recited in claim 1, including a plurality of tabs (42, 46, 50)
   and corresponding slots (44, 48, 52).

6. The assembly as recited in claim 5, wherein at least one of the plurality of
   tabs (42, 46, 50) and the corresponding one of the slots (44, 48, 52) are lockable.

7. The assembly as recited in claim 1, including at least three tabs (42, 46, 50)
   and corresponding slots (44, 48, 52).

8. The assembly as recited in claim 7, wherein only one of the at least three tabs
   (42, 46, 50) and corresponding slots (44, 48, 52) are lockable.

9. The assembly as recited in claim 1, wherein the opening (30) and orifice (34)
   are circular and the slot (44) and tab (42) are disposed about a circumference
   corresponding to the opening and orifice (34).
10. The assembly as recited in claim 9, wherein the tab (42) is received within the corresponding slot (44) by rotation of the orifice (34) relative to the partition (28).

11. A method of preventing disassembly of an air conditioner assembly component comprising the steps of:
   a) defining an opening for receiving an orifice (34) within a partition (28);
   b) inserting the orifice (34) into the opening (30) of the partition (28);
   c) rotating the orifice (34) relative to the partition (28);
   d) engaging a tab (42) on the orifice (34) with a slot (44) disposed on the partition (28); and
   e) locking the tab (42) within the slot (44) such that a locking feature of the tab (42) is hidden from view.

12. The method as recited in claim 9, wherein the slot (44) includes an inner surface (25) that includes an undercut (58) for receiving a locking feature (54) of the tab (42) and the step d includes receiving the locking feature (54) within the undercut (58).

13. The method as recited in claim 9, wherein the step d includes engaging at least three tabs (42, 46, 50) into at least three corresponding slots (44, 48, 52).

14. The method as recited in claim 11 wherein at least one of the plurality of tabs (42, 46, 50) and corresponding slots (44, 48, 52) are lockable with each other.