

- [54] CENTRIFUGAL FAN

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tin
- [52] U.S. Cl.415/201, 415/204, 417/363

[51] Int. Cl.F04d 1/00, F04d 29/40

[58] Field of Search.....415/204, 206, 201, 219 C;
417/363

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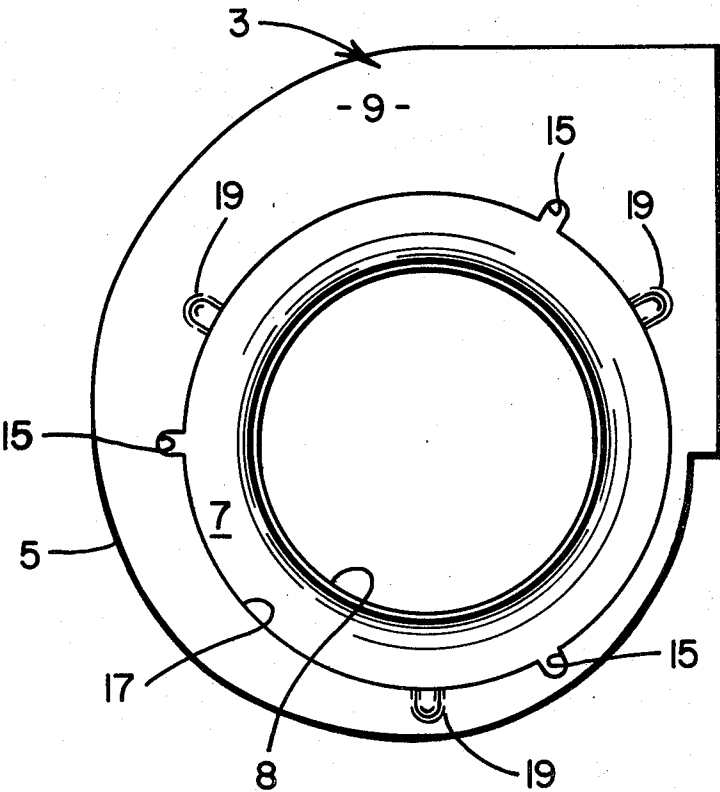
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[57] ABSTRACT

A centrifugal fan assembly including a removable orifice ring having tabs thereon, the ring being formed from the material removed in the production of the side plate of the fan housing, the diameter of the orifice ring being substantially equal to the diameter of the opening in the side plate of the fan housing, the tabs on the orifice ring being utilized to locate the orifice ring on the side plate of the fan housing.

4 Claims, 5 Drawing Figures



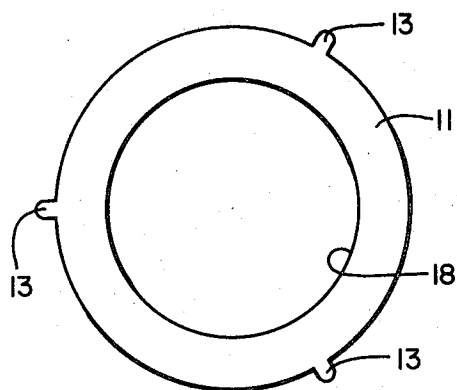


FIG. 2

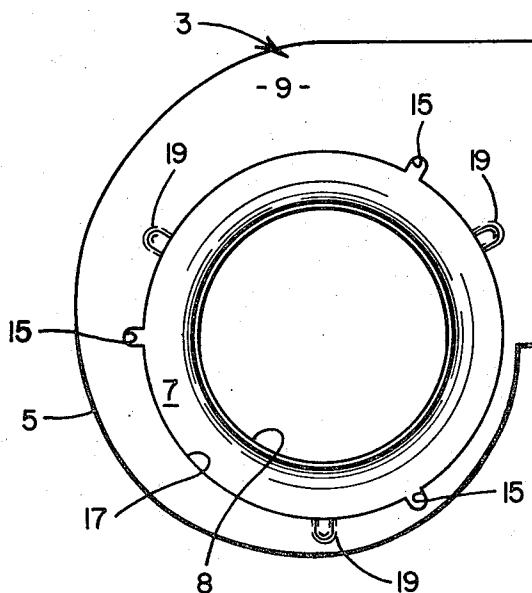


FIG. 1

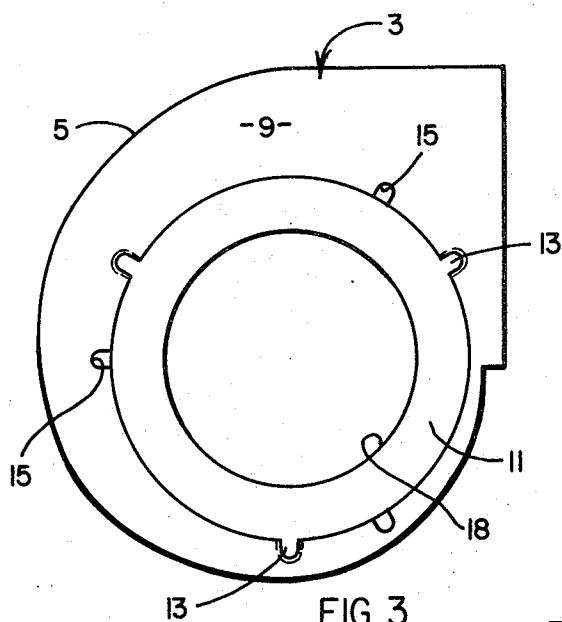


FIG. 3

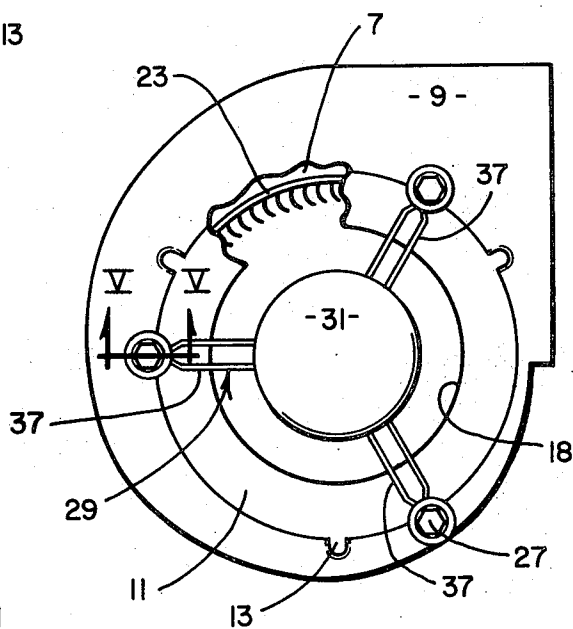


FIG. 4

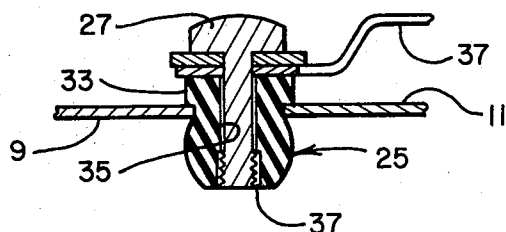


FIG. 5

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CENTRIFUGAL FAN

BACKGROUND OF THE INVENTION

Centrifugal fans generally comprise a fan wheel mounted for rotation within a scroll-shaped housing. The housing is provided with circular inlet openings centered with respect to the fan wheel shaft. To improve fan performance, the inlet openings are smaller than the outside diameter of the fan wheel. To assemble the fan, a portion of one side of the fan housing may be removably secured to the housing by bolts or sheet metal screws. Ordinarily, the side of the fan housing is provided with a circular opening slightly larger than the diameter of the fan wheel. An inlet or orifice ring having an outside diameter greater than the diameter of the opening in the housing and an inside diameter equal to the desired inlet opening diameter is placed over the opening in the fan housing and fasteners are inserted through the portion of the orifice ring and the portion of the housing which are in overlapping relationship to attach the orifice ring to the housing. A plurality of fasteners are employed for this purpose. Since the outside diameter of the orifice ring is greater than the diameter of the opening in the side of the fan housing, the orifice ring and the side of the housing must be stamped from separate pieces of sheet metal stock.

SUMMARY OF THE INVENTION

This invention relates to a centrifugal fan assembly and a method for manufacturing a fan housing having a scroll-shaped wrapper with first and second side plates secured thereto, the second side plate having a circular opening therein and a plurality of notches communicating with the circular opening. An orifice plate having a central circular opening is provided, the plate being formed by the material removed from the second side plate to provide the circular opening therein, the orifice plate thereby having a diameter substantially equal to the diameter of the circular opening in the second side plate. The orifice plate has tabs formed thereon as a result of the formation of the notches in the second side plate. The tabs are adapted for engagement with the second side plate at a location circumferentially spaced from the notches in the second side plate to position the orifice plate on the second side plate over the circular opening therein.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of a fan housing with the orifice plate removed therefrom;

FIG. 2 is an illustration of an orifice plate for use with the fan housing of FIG. 1;

FIG. 3 is a side view of a fan housing with the orifice plate of FIG. 2 placed thereon;

FIG. 4 is a side view of a centrifugal fan assembly with a portion broken away; and

FIG. 5 is a sectional view taken along line V—V of FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring more particularly to the drawing, there is illustrated a fan housing 3 comprised of a scroll-shaped wrapper 5, a first side plate 7 and a second side plate 9. Side plate 7 is provided with an air inlet opening 8 hav-

ing a diameter less than the diameter of the fan wheel to be employed in the housing.

Side plate 9 and a circular orifice plate 11 are provided by blanking orifice plate 11 from side plate 9. Tabs 13 are formed on orifice plate 11 which results in notches 15 being formed in side plate 9. The diameter of opening 17 formed in side plate 9 by the removal of the orifice plate 11 therefrom is therefore substantially equal to the diameter of the orifice plate. An air inlet opening 18 in orifice plate 11 and the air inlet opening 8 in side plate 7 are provided for passage of air into the fan housing.

A plurality of depressions 19, corresponding to the number of tabs formed on orifice plate 11, are formed in side plate 9. The depressions 19 are circumferentially spaced from notches 15 to receive tabs 13 and position orifice plate 11 in the plane of side plate 9.

The side plate 9 is preferably formed by first piercing and forming the air inlet opening 18. The blank is then notched and pierced to provide the approximate exterior shape of the side plate before depressions 19 are formed therein and the orifice plate 11 is blanked out.

The circular opening 17 formed in side plate 9 is sized to allow insertion of a fan wheel 23 into the completed housing.

The notches 15 provide openings for insertion of resilient grommets 25 and bolts 27 to mount a fan motor support bracket 29 on the housing and secure the orifice plate within opening 17. The motor support bracket, which is adapted to support and position a fan motor 31 and the fan wheel 23 which is secured to the shaft of the fan motor, is provided with a plurality of arms 37 corresponding to the number of notches in side plate 9.

To mount the motor support bracket and the orifice plate on the fan housing, the resilient grommets, which have an enlarged headed portion 33, a central bore 35 and internally threaded insert 37, are inserted into the notches in the side plate after the orifice plate is positioned thereon with the tabs aligned with depressions 19. The bolts 27 are then inserted through openings in the motor support bracket arms, threaded into the grommets 25 and tightened. This causes the grommets to "swell" on the inner side of side plate 9 to resiliently secure orifice plate 11 and motor support bracket 29 on side plate 9.

It can be seen from the foregoing that a centrifugal fan assembly is provided which generates a minimum quantity of scrap material in the fabrication thereof and which requires a minimal number of fasteners for assembly. Further, the second side plate including the central opening, depressions and notches and the orifice plate with tabs may be formed by simple stamping operations. Since the notches are adapted to receive the motor support bracket fasteners, further operations to form openings for fasteners are unnecessary.

While we have described a preferred embodiment of our invention, it is to be understood that the invention is not limited thereto, since it may be embodied within the scope of the following claims.

We claim:

1. A centrifugal fan assembly comprising a housing having a scroll-shaped wrapper, a first side plate associated with said wrapper,

a second side plate having a circular opening therein disposed opposite said first side plate on said scroll wrapper, said second side plate having a plurality of notches formed therein communicating with the circular opening,

an orifice plate having a central circular opening therein, said orifice plate comprising material removed from said second side plate to provide the circular opening therein, said orifice plate thereby having a diameter substantially equal to the diameter of the circular opening in said second side plate, said orifice plate having tabs thereon resulting from the formation of the notches in said second side plate, said tabs being adapted for engagement with said second side plate at a location circumferentially spaced from the notches in said second side plate to position said orifice plate on said second side plate over the circular opening therein, and

a fan wheel having an outer diameter larger than said orifice in said plate and less diameter than the circular opening in said second side plate mounted for rotation within said housing between said side plates.

2. A centrifugal fan assembly according to claim 1 further including support means for rotatably supporting said fan wheel within said housing, and fastening means adapted for cooperation with the notches in said

side plate for securing said support means to said second side plate.

3. A centrifugal fan assembly according to claim 2 wherein said fastening means comprise:

a resilient grommet having an enlarged portion on one end thereof,

internally threaded means affixed to the other end of said grommet, said grommet being adapted for insertion through the notches in said second side plate with the other end thereof projecting into said housing, said enlarged portion engaging the outer surface of said orifice plate and said second side plate; and

bolt means adapted for insertion through the center of said grommet for engagement with said threaded means, said bolt being adapted for insertion through said support means into said grommet, subsequent tightening of said bolt causing the diameter of said resilient grommet internally of said housing to expand into engagement with said orifice plate and said second side plate to secure said orifice plate and said support means on said second side plate.

4. A centrifugal fan assembly according to claim 3 wherein said first side plate is provided with an orifice therein for passage of air into said housing.

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