

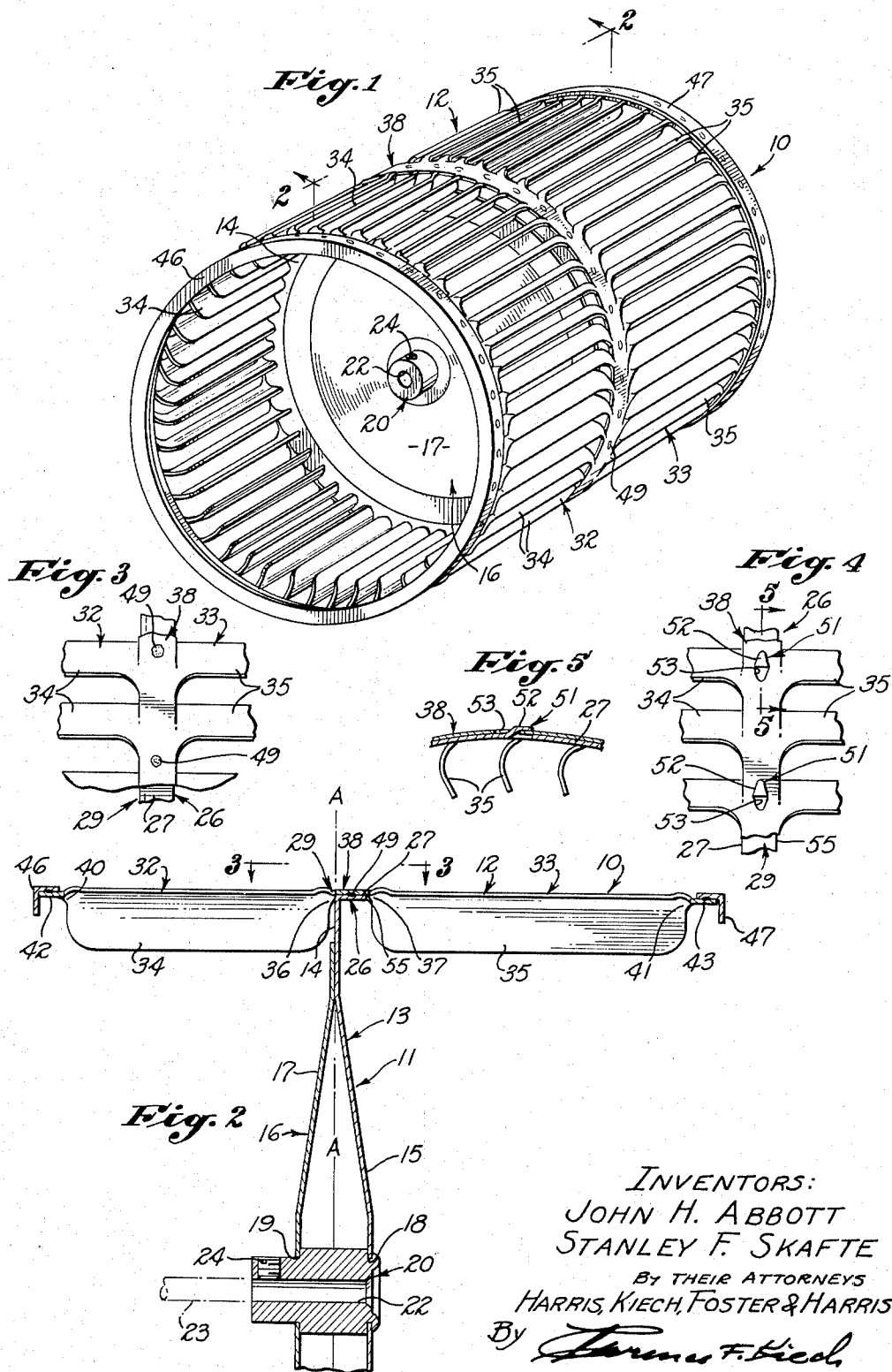
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BLOWER WHEEL

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BLOWER WHEEL

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This invention relates to blower wheels and, more particularly, to blower wheels of the type which include a central plate for mounting the blower wheel to the drive shaft.

The prior art practice in providing such blower wheels, that is, blower wheels with two banks of vanes, has been either to mount two single inlet blowers in back-to-back relationship upon the drive shaft of the motor or the blower shaft with which the blower wheels are associated. Naturally, such expedients necessitate the manufacture of individual blowers which will subsequently be joined in operative relationship with each other. Also, these blowers cannot be identical; one must be counter-clockwise and the other clockwise in rotation. Prior art practice also fastens the center plate to the vanes themselves. This construction makes it necessary to have the blades of substantially heavier material than in the construction described in this specification.

Where attempts have been made in the prior art to provide a plurality of banks of vanes in one blower, the complexities of structure occasioned by the large number of vanes which must be provided and the difficulties in manufacture have resulted in relatively high manufacturing costs.

It is, therefore, a primary object of our invention to provide a blower wheel having a plurality of banks of vanes which is of relatively simple construction, includes a minimum number of component parts, and which can be readily and cheaply manufactured.

Another object of our invention is the provision of a blower wheel which includes a mounting plate upon the peripheral edge of which is adapted to be mounted a drum formed of sheet metal, said drum having a mounting strip formed between the banks of vanes, and said mounting strip being adapted to be engaged by the peripheral edge of the mounting plate.

An additional object of our invention is the provision of a blower wheel having a plurality of banks of vanes which includes a mounting plate having a mounting portion, said mounting portion being adapted to engage and support a drum formed from sheet metal and having provided therein a plurality of banks of vanes, said drum including a mounting strip between adjacent banks of vanes adapted to engage the mounting portion of said mounting plate.

One of the major problems encountered in prior art double blowers has been the alignment of the multiplicity of vanes in the plurality of banks of vanes. It is absolutely necessary that the vanes in each bank be accurately aligned with respect to one another and that the individual banks be accurately aligned with respect to each other.

A further object of our invention is the provision of a blower wheel which includes a mounting plate, said mounting plate having alignment means adapted to engage a sheet metal drum having integrally formed therein a plurality of banks of vanes in such a manner that the

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banks of vanes and the individual vanes incorporated therein are aligned with respect to one another.

An additional object of our invention is the provision of a blower which includes a mounting plate having alignment means and adapted to support a drum formed of sheet metal and having a plurality of banks of vanes formed therefrom, said alignment means of said plate being adapted to engage the vanes of said drum to align said vanes with respect to a vertical plane between the banks of vanes.

Another object of our invention is the provision of a blower wheel which includes a mounting plate, said mounting plate having formed thereupon a peripheral, axially directed, mounting flange, said flange being adapted to support a sheet metal drum having formed therein a plurality of vanes arranged in opposed banks and said axially directed flange being adapted to engage a mounting strip disposed between adjacent banks of vanes.

An additional object of our invention is the provision of a blower wheel of the aforementioned type which includes fastener means formed integrally with the axially directed mounting flange of said plate and receptacle means provided in the mounting strip of the sheet metal drum adapted to receive said fastener means of said mounting flange to secure said drum to said plate.

Other objects and advantages of our invention will be apparent from the following specification and the accompanying drawing, which is for the purpose of illustration only, and in which:

Fig. 1 is a perspective view of a blower wheel constructed in accordance with our invention;

Fig. 2 is a vertical, partly sectional view taken on the broken line 2—2 of Fig. 1;

Fig. 3 is a fragmentary plan view taken from the broken line 3—3 of Fig. 2;

Fig. 4 is a fragmentary view of the fastener means of our invention; and

Fig. 5 is a transverse sectional view taken on the broken line 5—5 of Fig. 4.

Referring to the drawing and, more particularly, to Figs. 1 and 2 thereof, we show a blower wheel 10 constructed in accordance with our invention. The blower wheel 10 includes a mounting plate 11 which is of circular configuration and a drum 12 of generally cylindrical configuration supported upon said mounting plate. The mounting plate 11 includes a first, circular disc 13 having a flat peripheral portion 14 and a centrally located, dished portion 15. Securely fastened to the circular disc 13, as by means of spot welding, is a second disc 16 of somewhat less diameter, said second disc having a centrally located, oppositely dished portion 17 which is juxtaposed to the dished portion 15 of the circular disc 13 to rigidify the mounting plate 11.

Oppositely disposed openings 18 and 19 are provided respectively in the dished portions 15 and 17 of the discs 13 and 16, and disposed in said openings is a substantially cylindrically shaped hub member 20 which is secured in the openings 18 and 19 by means of welding or any similar expedient. Thus, the oppositely dished portions 15 and 17 of the discs 13 and 16 also provide oppositely disposed contiguous openings 18 and 19 which constitute a mount for the hub 20.

The hub 20 has formed therein a transverse bore 22, said bore being adapted to receive the end of a drive shaft 23. A set screw 24 threadedly engaged in the wall of the hub 20 impinges on the periphery of the drive shaft 23 to maintain the mounting plate 11 in a predetermined position upon said drive shaft.

The mounting plate 11, and more particularly the first disc 13, includes a mounting portion 26 constituted by an axially directed flange 27. The mounting plate 11

also provides alignment means 29, said alignment means being constituted by that portion of the plate 11 and, more particularly of the disc 13, which joins the axially directed mounting flange 27 with the peripheral flat portion 14 of the disc 13, for a purpose which will be described in greater detail below.

The drum 12 is formed of sheet metal, and prior to its installation upon the mounting plate 11 is constituted by an elongated, rectangular strip of sheet metal which is mounted upon the mounting plate 11 in a manner to be described in greater detail below. The drum 12 includes a plurality of banks of vanes 32 and 33, the bank 32 including vanes 34 and the bank 33 including vanes 35. The innermost root portions 36 and 37 of the vanes 34 and 35 which are contiguous to each other are formed integrally with a substantially centrally located mounting strip 38. The outermost root portions 40 and 41 of the vanes 34 and 35, respectively, are formed integrally with end strips 42 and 43.

As may be most clearly seen from Figs. 1 and 2 of the drawing, the vanes 34 and 35 of the banks 32 and 33 are directed inwardly in a substantially radial direction toward the axis of the blower wheel 10. Provided upon the end strip 42 and securely fastened thereto, as by means of welding, is an end ring 46, said end ring serving to further rigidify the drum 12 and being of substantially right-angle shape in cross section. Disposed upon and secured to the end strip 43, as by means of welding, is an end ring 47 which is of substantially right-angle shape in cross section and which serves to rigidify that end of the drum 12 upon which it is fastened.

When the drum 12 and mounting plate 11 are disposed in operative relationship with each other, the centrally located mounting strip 38 is disposed in contiguity with the axially extending mounting flange 27 of the mounting plate 11. The centrally located mounting strip 38 of the drum 12 can be secured to the mounting flange 27 of the mounting plate 11 by means of welding, as indicated at 49 in Fig. 3 of the drawing. However, if it is not desired to weld the centrally located mounting strip 38 of the drum 12 upon the mounting flange 27 of the mounting plate 11, an alternative mounting means, best shown in Figs. 4 and 5 of the drawing, can be utilized. In this construction, the mounting flange 27 is provided with a plurality of upstruck fastening means 51 constituted by tongues 52, which are formed integrally with the mounting flange 27. Formed in the centrally located mounting strip 38 of the drum 12 and disposed at distances from one another which are equal to the distances between the tongues 52 on the mounting flange 27, is a plurality of orifices 53, said orifices being adapted to receive the tongues 52 and the tongues being subsequently bent over a portion of the area of the centrally located mounting strip 38 contiguous to the orifices to retain the drum in operative relationship with the mounting plate 11.

As indicated previously, one of the major obstacles to be overcome in the manufacture of blowers having a plurality of banks of vanes is the alignment of the banks with respect to one another and of the vanes within the banks with respect to each other and with respect to the vanes in contiguous banks. As best shown in Figs. 2, 3, and 4, the alignment means 29 provided by the mounting plate 11 is adapted to engage the root portions 36 of the vanes 34 of the bank 32 formed in the blower drum 12. Since the alignment means 29 is contacted by the root portions 36 of all of the vanes 34 in the bank 32 and since the alignment means 29 is substantially coincident with a plane A—A between the banks of vanes, all of the vanes 34 are properly and axially arranged with respect to one another. Of course, since the vanes 35 of the bank 33 are integrally formed with the vanes 34 of the bank 32 and are connected thereto by means of the centrally located mounting strip 38, the adjustment of the

vanes 34 through the contact of the root portions 36 thereof with the alignment means 29 causes the automatic adjustment of the bank 33 with respect to the bank 32 and, in turn, the automatic alignment of the vanes 35 of the bank 33 with respect to each other and with respect to the vanes 34 of the bank 32. In this manner, a simple and economical means for readily achieving the alignment of the banks of vanes with respect to each other and of the vanes within the bank with respect to one another is provided.

If desired, the peripheral edge 55 of the mounting flange 27 can be utilized as an auxiliary alignment means by extending the width of the mounting flange 27 so that it equals the width of the mounting strip 38 of the drum 12, thus bringing the peripheral edge 55 of the mounting flange 27 into contact with the roots 37 of the vanes 35 of the bank 33. However, it has been found that the provision of the alignment means 29 is sufficient to properly and axially align the banks 32 and 33 and the vanes 34 and 35 of said banks with respect to one another. Thus, when the assembly is completed by the fastening of the centrally located strip 38 of the drum 12 to the mounting flange 27 of the mounting plate 11, the component portions of the drum 12 are axially aligned with respect to one another. In addition, considerable structural rigidity is imparted to the entire blower by the contact of the alignment means 29 with the roots 36 of the vanes 34 and by the relatively large surface area of the mounting flange 27 of the mounting plate 11 which is in contact and in continual engagement with the centrally located mounting strip 38 of the drum 12. It will be noted that because of the alignment of the vanes and banks by the alignment means 29, the vanes and banks are properly and axially oriented with respect to a vertical plane represented by the line A—A of Fig. 3 of the drawing.

Considering now the manner in which the blower wheel 10 is assembled, the hub 20 is fastened to the disc 13 through opening 18 by welding or curling. Then the opening 19 in the second disc 16 is placed over the hub 20. This aligns the disc 16 which is subsequently welded to the first disc 13. An elongated strip of sheet stock which has the banks 32 and 33 formed therein and the vanes 34 and 35 properly formed and disposed therein is wrapped around the mounting plate 11, the axially directed mounting flange 27 of the mounting plate 11 being inserted between the adjacent roots 36 and 37 of contiguous vanes 34 and 35 to engage the centrally located mounting strip 38.

Prior to fastening the axially directed mounting flange 27 to the centrally located mounting strip 38, the roots 36 of the vanes 34 are moved into engagement with the alignment means 29 of the mounting plate 11 to orient the bank 32 and the vanes 34 thereof axially of the mounting plate 11 to insure the proper alignment of the bank and vanes therein and to accomplish the automatic alignment of the bank 33 and the vanes 35 incorporated therein. After this alignment step has been taken, the centrally located strip 38 is fastened to the axially directed flange 27 of the mounting plate 11 either by welding or by the use of the integral fasteners 51 and the openings 53, as indicated previously.

Subsequently to the fastening of the axially directed flange 37 of the mounting plate 11 to the centrally located mounting strip 38, the end rings 46 and 47 are fastened, respectively, to the end strips 42 and 43, as by means of welding.

Thus, in relatively few steps the entire blower assembly may be assembled and the component elements thereof properly aligned with respect to one another and properly secured to one another. In this manner we provide a blower wheel which is of simple construction, which includes a minimum number of parts, and which may be readily and easily assembled subsequently to the fabrication of said parts.

We claim as our invention:

1. In a blower wheel, the combination of: a circular mounting plate having a mounting portion constituted by a flat, axially directed flange formed integrally therewith and a centrally located hub fastened thereto, an edge of said flange providing alignment means; a plurality of fasteners formed integrally with said flange; and a cylindrical drum having a flat, axially directed mounting strip engaged by said flange, said strip being provided with a plurality of receptacles for engagement by said fasteners, said drum having a plurality of banks of vanes formed integrally with said mounting strip and disposed on opposite sides thereof and the roots of the vanes in one of said banks being directly engaged by said alignment means.

2. In a blower wheel, the combination of: a circular mounting plate having an axially directed, peripheral flange formed integrally therewith, the opposite edges of said flange constituting vane alignment means; a plurality of fasteners formed integrally with said flange, said fas-

teners being constituted by a plurality of integral tongues extending radially outwardly from said flange; and a cylindrical drum having a flat, axially extending mounting strip whose width is equal to the width of said flange and which is engaged thereby, said strip having a plurality of spaced openings receiving the tongues of said fasteners, said drum having two banks of vanes formed integrally therewith, one on each side of said strip, said vanes extending toward the axis of said drum and having root portions engaging said opposite edges of said flange.

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