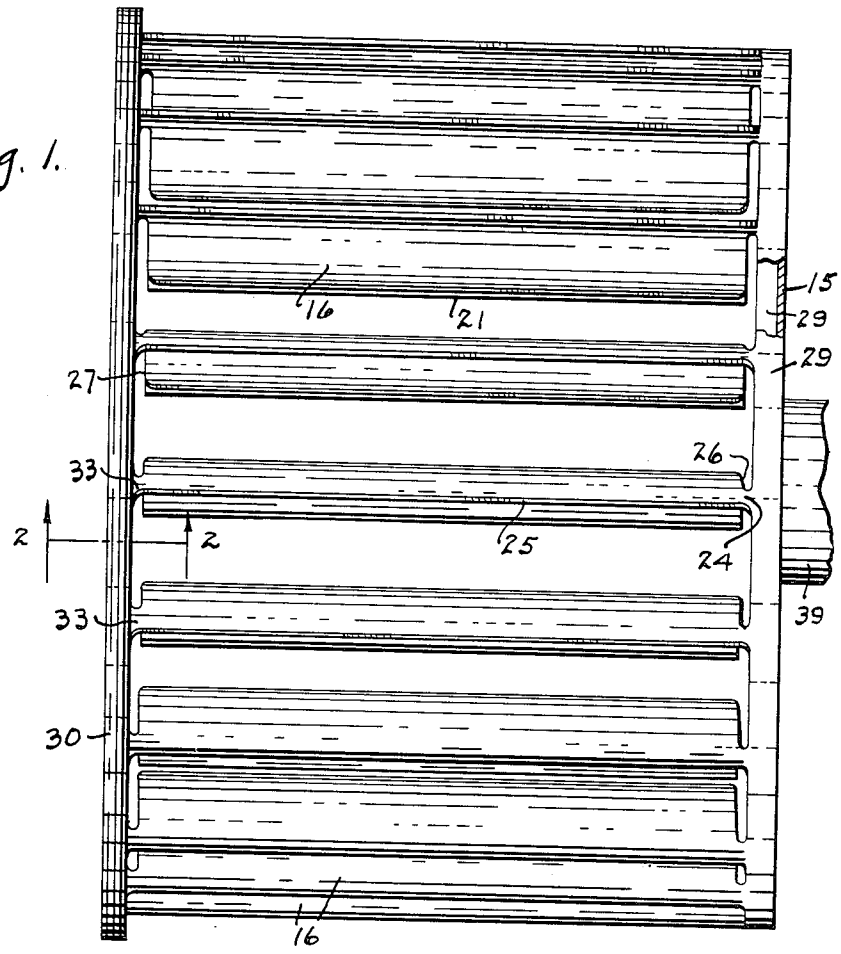
Nov. 20, 1956 L. E. SPROUSE 2,771,241

BLOWER WHEEL

Filed Nov. 25, 1953

4 Sheets-Sheet 1

Fig. 1.



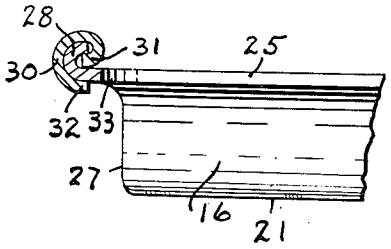


Fig. 2.

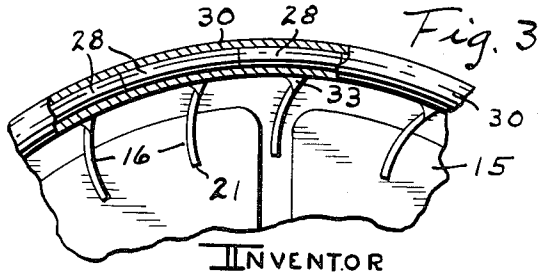


Fig. 3.

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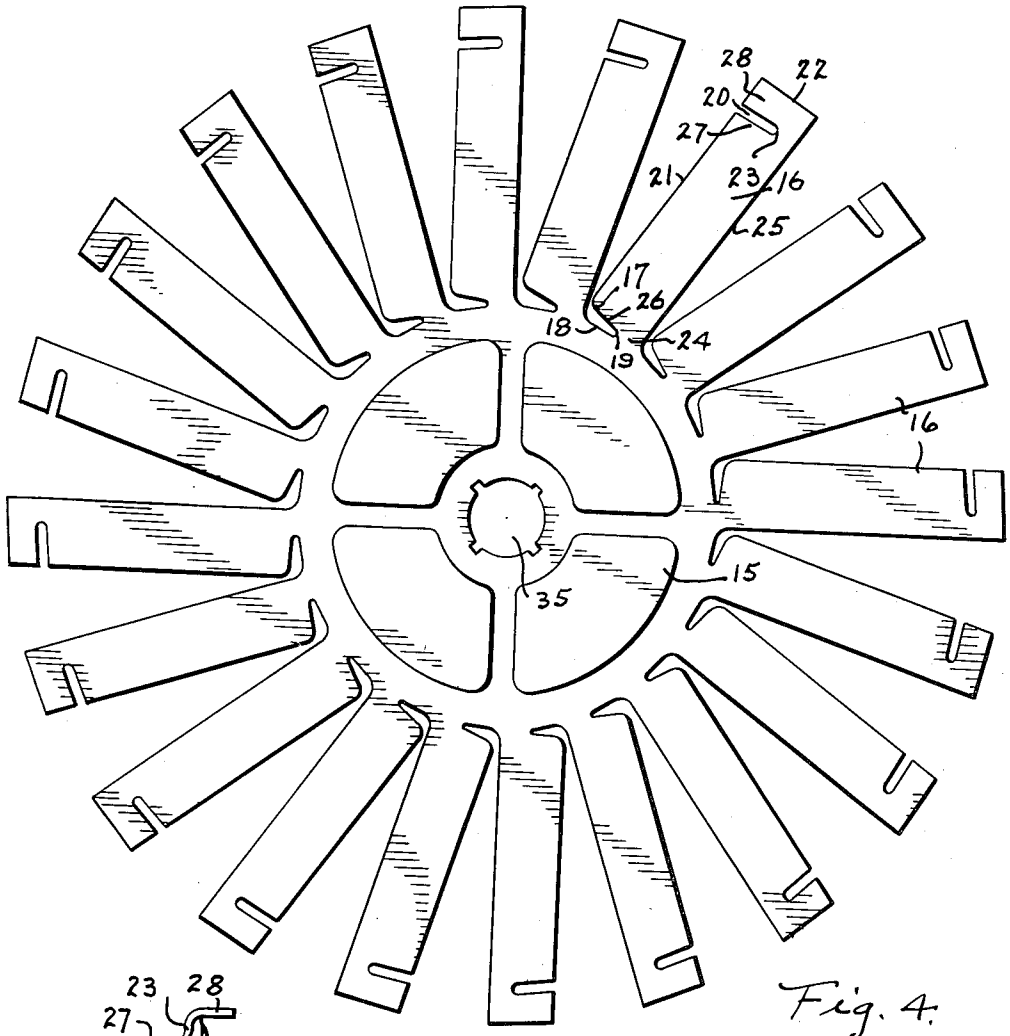

Fig. 4.

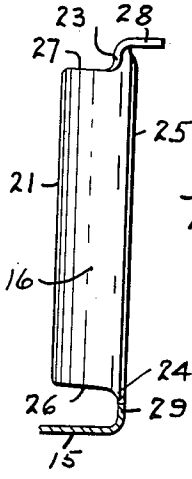

Fig. 5.

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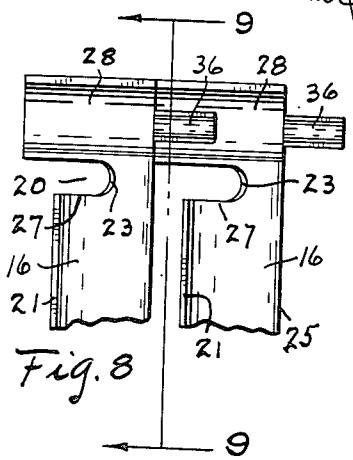

Fig. 8

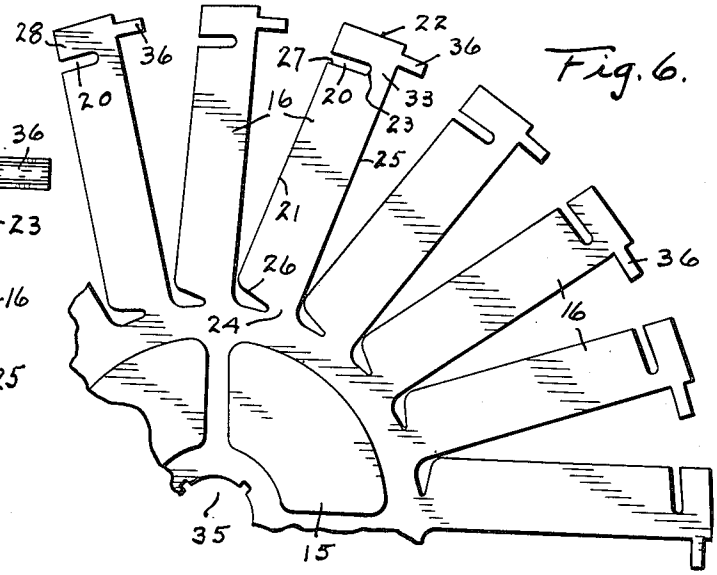

Fig. 6.

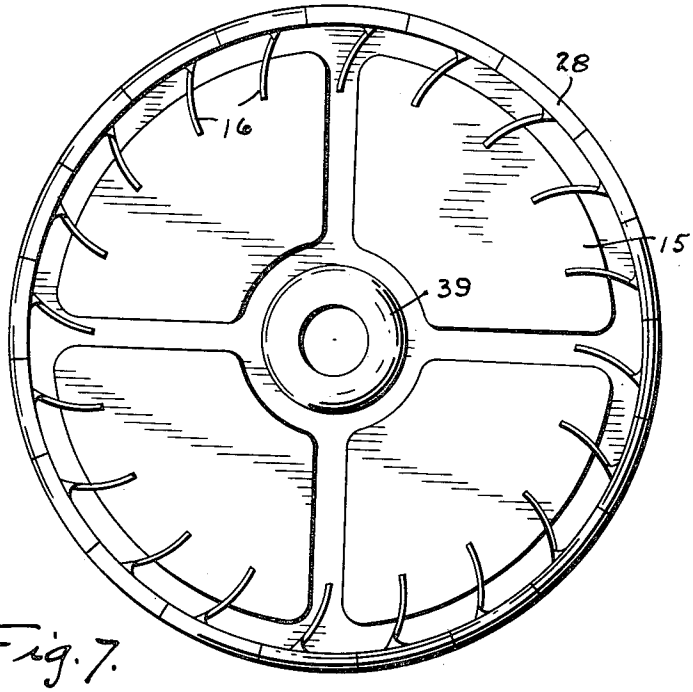

Fig. 7.

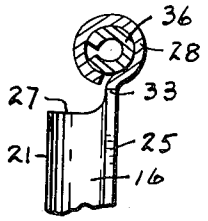

Fig. 9

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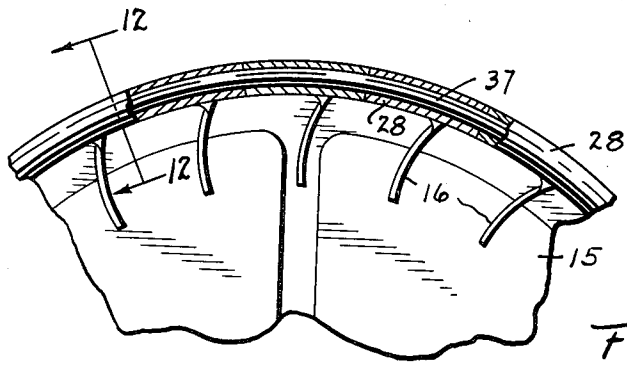

Fig. 10.

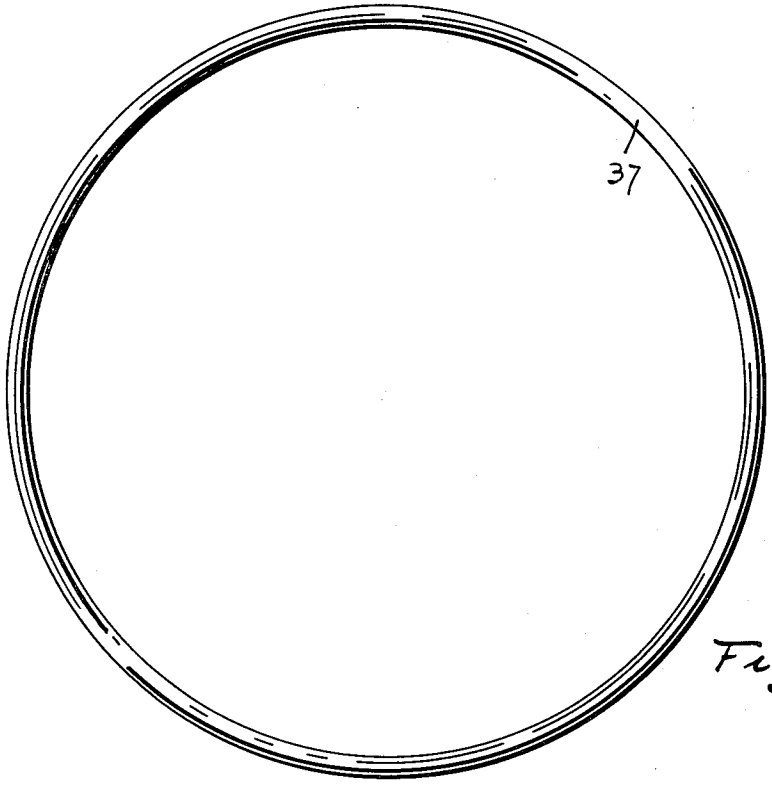

Fig. 11.

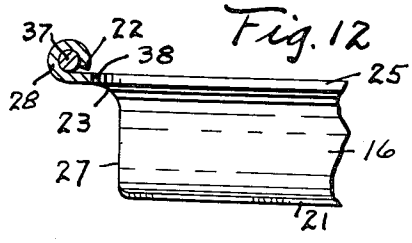

Fig. 12

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United States Patent Office 2,771,241
Patented Nov. 20, 1956

2,771,241

BLOWER WHEEL

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Application November 25, 1953, Serial No. 394,271

4 Claims. (Cl. 230—134)

This invention relates to blower wheels of that type wherein the air intake is axially of the wheel and the discharge is radial. The invention involves the formation of a blower wheel wherein all of the blades and a back supporting plate are formed in one piece; the blades turned into positions perpendicular to the plate; and the outer ends of the blades secured against displacement by one of several novel means, all to the end that the absolute minimum number of elements are required in the resultant blower wheel, and yet at the same time, the wheel has extreme rigidity and efficiency relative to the displacement of air.

Furthermore there is inherent in this structure forming the invention a minimum restriction to air flow.

These and many other objects and advantages of the invention will become apparent to those versed in the art in the following description which is made in reference to the accompanying drawings, in which

Fig. 1 is a view in side elevation of a structure embodying the invention;

Fig. 2 is a detail on an enlarged scale taken on section 2—2 in Fig. 1;

Fig. 3 is a detail in partial end elevation and section of means for securing the ends of the blades entering into the wheel;

Fig. 4 is a view in plan of a blank which has been cut and is ready for forming into the blade shapes and wheel form;

Fig. 5 is a detail in elevation of a single blade in a stage progressing from the form shown in Fig. 4;

Fig. 6 is a detail in top plan of a portion of a blank in modified form from that illustrated in Fig. 4;

Fig. 7 is a view in end elevation of a blower wheel made from a blank as illustrated in Fig. 6;

Fig. 8 is a detail in side elevation of a portion of two adjacent blades of the form shown in Fig. 6;

Fig. 9 is a detail in section on the line 9—9 in Fig. 8;

Fig. 10 is a detail in partial elevation and section of a further modified form of securing the ends of blades;

Fig. 11 is a view in elevation of a ring entering into the construction shown in Fig. 10; and

Fig. 12 is a detail in section through the interconnecting means on the line 12—12 in Fig. 10.

Referring to Figs. 1–5, a blank, Fig. 4, is formed to have a back plate 15 from which radiate a plurality of initially flat blades 16 as will be noted. Adjacent blades 16 are separated at their inner ends 17 and have those ends undercut on a circumferential line 18 back to a point 19 which in the present showing is substantially on the center line of the blade in each instance, being if anything somewhat past the center line from the corner 19.

The outer end of each blade 16 has an entering notch 20 cut from the edge 21 of the blade and spaced inwardly from the outer end 22. This notch extends slightly past the center line of the blade 16, to have its inner end 23 on a line with the point 19 parallel with the edge 21. Each blade is attached to the plate 15 by a neck 24 between the point 19 and the blade edge 25.

Each of the blades 16 is formed to the desired curvature between the back end edge 26 and the outer end edge 27 at the notch 20, and the blade 16 in each instance is twisted about its neck 24.

All the blades 16 are carried around into substantially perpendicular relationship to the plate 15 by bending the neck 24 as indicated in Fig. 5, and the outer end portion 28 between the notch 20 and the outer end 22 is bent outwardly. It is to be noted, Fig. 1, that the plate 15 is formed from the blank shown in Fig. 4 to have a flange 29 turned therefrom, so that necks 24 are carried forwardly or outwardly the distance from the plate 15 equally the length of the flange 29 measured perpendicularly to the plate 15.

A ring 30 annular in form is rolled around the blade ends 28 to curve those blade ends 28 around and over an inturned lip 31 of the ring 30, Fig. 2, and also to have a lip 32 on the other edge of the ring 30 carried around and against the opposite side of the portion 28. In this manner, the ring 30 securely includes therewithin each of the blade end portions 28 in a very secure manner so that these blades 16 are held in their uniform, spaced apart relation, the end portions 28 abutting one against the other. In the forming of the end portion 28 in each instance, these end portions are twisted around on the neck portions 33 which are those portions between the inner end of the notch 20 and the edge 25 of each blade.

The plate 15 is formed to have a central hole 35 therethrough, and a hub 39, Fig. 1, is interconnected through that hole with the plate 15 in driving relation.

Referring to Figs. 6–9, the plate 15 carries the blades 16 which are formed in exactly the same manner as the blades shown in Fig. 4, with the exception that each of the blades 16 has a finger 36 extending substantially perpendicularly from the edge 25 above the neck 33 and below the outer edge 22, this finger 36 being centered between the notch 20 and the edge 22.

When the blades 16 are brought up into their positions perpendicular to the plate 15 as illustrated in Fig. 7, the finger 36 of one blade 16 will overlap the end portion 28 of the next adjacent blade 16, Fig. 8. Preferably the end portions 28 in each instance are formed to be semi-cylindrical thereacross, and also the finger 36 is likewise formed to be semi-cylindrical and then the end portion 28 is folded around the finger 36 in each instance to compress the finger 36 tightly therewithin to bring the portion 28 and the enclosed finger 36 into that shape as indicated in Fig. 9. In this manner, one blade 16 is fixed in respect to its outer end portion to the next adjacent blade 16 by the gripping of the first blade finger 36 within the next adjacent end portion 28.

A still further method of fixing the outer ends of the blades 16 is illustrated in Figs. 10–12, wherein the end portions 28 are rolled over a wire ring 37, so that the circumferentially spaced ends of the portions abut one another around the ring 37, and the portion 28 is carried entirely around the ring to that extent whereby the outer edge 22 approaches closely the portion 28 adjacent the outer edge 38 of the notch 20, Fig. 12.

It is to be seen that the major lengths of the edges 26 of the blade 16 adjacent the plate 15 are out of contact with that plate and are only tied thereto through the necks 24 carried by the flange 29, and also that the outer ends of the blades 16 have their major lengths defined by the lines 27 free from any covering over beyond the necks 33. Thus, with a minimum number of separate

parts, a very rigid and rugged construction is provided with the minimum obstruction to air flow.

Therefore while I have herein shown my invention in the forms now best known to me, it is obvious that structural variations may be employed without departing from the spirit of the invention, and therefore do not desire to be limited to those precise forms beyond the limitations which may be imposed by the following claims.

I claim:

1. A blower wheel comprising a circular base plate; a plurality of blades extending normally and circumferentially of said plate; the outer end portion of each of said blades having a laterally entering notch traversing the blade to define an outer end portion extending across the blade approximately half the width of the portion leaving a neck; a finger extending laterally from each of said outer ends intermediate said notch and the outer end edge of the blade and lapping over the next adjacent blade outer end portion; said outer end portion of one blade encircling and compressibly gripping therewithin the finger of the next adjacent blade.

2. A blower wheel comprising a supporting member; a plurality of blades carried by and extending from said member in approximate parallelism terminating by free, separated ends adjacent one another; a finger extending laterally from one side of the end portion of each of said blades; and the end portion of each of said blades encircling and gripping said finger of the next adjacent blade.

3. The structure of claim 2 in which said finger is deformed substantially cylindrically within said blade end portion.

4. The structure of claim 2 in which said end portions of the blades abut one another and form in effect a continuous circumferential tunnel within which are carried said fingers.

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