May 24, 1949. J. H. ABBOTT ET AL 2,470,966

ROTOR

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Fig. 1

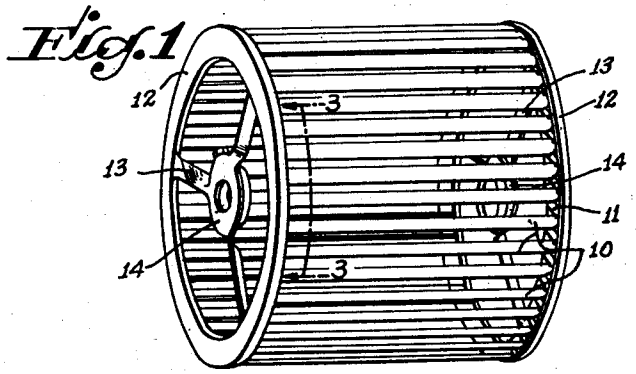


Fig. 3

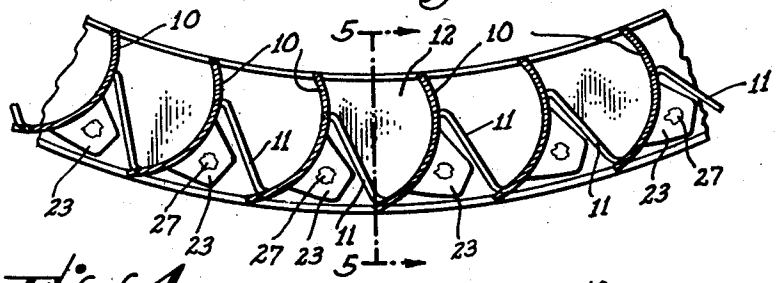


Fig. 4

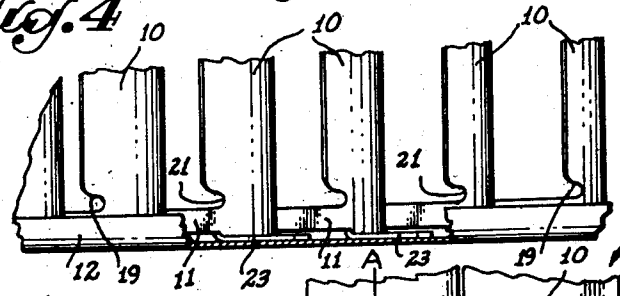


Fig. 5

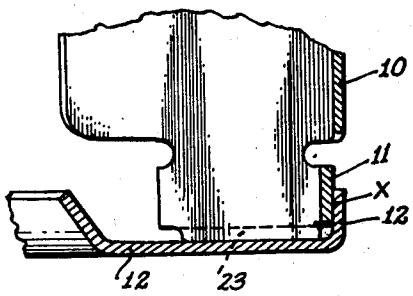
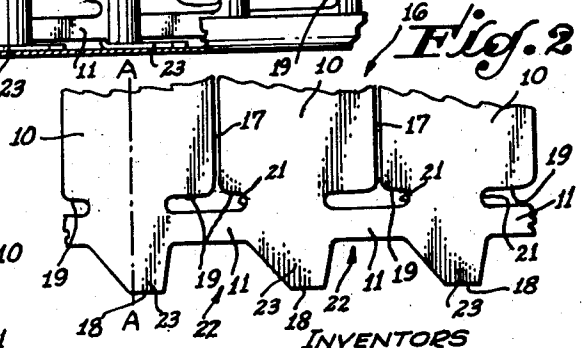


Fig. 2



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ROTOR

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6 Claims. (Cl. 230—134)

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Our invention relates generally to rotors for rotary blowers and, more specifically, to rotors which incorporate a plurality of adjacent elongated vanes. The fundamental concepts of our invention are particularly applicable to the fabrication of rotors which incorporate a cylindrical arrangement of adjacent vanes wherein the longitudinal axes of the vanes are substantially parallel to the longitudinal axis of the rotor.

Conventional rotors of the foregoing general character frequently incorporate individual vanes, the cylindrical arrangement thereof being maintained by securing the ends of each individual vane to suitable retaining members. Obviously the assembly of such conventional rotors is a relatively complex operation and care must be exercised to provide a uniform spacing of the individual vanes.

Consequently, as a primary objective of our invention, we prefer to simplify the fabrication of cylindrical rotors through the provision of a rotor construction wherein the vanes are interconnected by segments which are formed integrally therewith. We contemplate effecting a realization of this objective by cutting a rectangular strip to provide transverse and longitudinal slits therein which define the vanes and interconnecting segments, the vanes being integrally interconnected by the segments.

Another primary objective of our invention is the provision of a rotor construction wherein the spacing of the vanes may be varied readily by the simple expedient of bending the interconnecting segments relative to the vanes, the segments lying substantially in planes that are parallel to the longitudinal axes of the vanes. The spacing of the vanes may also be varied by varying the length of the aforesaid longitudinal slits in accordance with another objective of our invention, thereby providing a simple means for varying the number of vanes incorporated in a particular rotor construction.

After the vanes have been formed and the desired spacing thereof has been achieved, the rectangular strip may be bent so that the longitudinal axis thereof defines a circle to provide a cylindrical rotor. In order to provide a rigid rotor construction, we prefer to secure each vane to suitable retaining members such as annular rims, this being an additional objective of our invention. We prefer to effect a realization of this objective by cutting the longitudinal edges of the rectangular strip to provide notches which define tabs that extend from the ends of the vanes, the tabs being bent relative to the vanes

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and being adapted for attachment to annular rims to provide the desired rigidity.

The foregoing and various other objectives and advantages of our invention may be realized by means of the embodiment thereof shown in the accompanying drawing, which is for illustrative purposes only, wherein:

Fig. 1 is a perspective view of a cylindrical rotor for a rotary blower which embodies the fundamental concepts of our invention;

Fig. 2 is a view illustrating a fragment of a member which may be employed in fabricating the rotor and illustrating various steps in the fabrication thereof;

Fig. 3 is a fragmentary sectional view which is taken as indicated by the arrowed line 3—3 of Fig. 1 and illustrates the details of the rotor construction;

Fig. 4 is a partially sectioned, fragmentary elevational view of the rotor; and

Fig. 5 is an enlarged fragmentary sectional view which is taken as indicated by the arrowed line 5—5 of Fig. 3.

Referring to the drawing, the rotor includes a plurality of substantially parallel adjacent elongated vanes 10 which are interconnected by segments 11 that are formed integrally therewith, the vanes 10 being secured to annular rims 12 as will be described in detail hereinafter. The annular rims 12 are connected to spiders 13, the latter being provided with hubs 14 for rotatably mounting the rotor in any suitable manner.

Referring particularly to Fig. 2, the rotor is formed from a member 16 which is preferably a rectangular strip (not shown in its entirety) of material which may be sheet metal, for example. The rectangular strip 16 is cut transversely to provide longitudinally-spaced, transverse slits 17 intermediate the longitudinal edges 18 thereof to define the vanes 10 between adjacent transverse slits 17, the slits 17 and longitudinal axes A—A of the vanes 10 being substantially perpendicular to the longitudinal axis of the rectangular strip 16. The strip 16 is also cut longitudinally to provide substantially aligned and spaced longitudinal slits 19 which are disposed adjacent and communicate with the ends of the transverse slits 17 to define the segments 11 which interconnect the ends of the vanes 10, the longitudinal slits 19 being substantially parallel to the longitudinal axis of the rectangular strip 16. The ends of the longitudinal slits 19 are preferably fabricated with radiused ends for the purpose of avoiding stress concentrations that would tend to crack the strip 16.

The longitudinal edges 18 of the strip 16 are cut to provide notches 22 adjacent the ends of the transverse slits 17, thereby providing tabs 23 which extend from the ends of the vanes 10. The tabs 23 are then bent at right angles to the body of the strip, thus forming feet.

The segment 11 and the vanes 10 are bent into the form shown in section in Fig. 3, so that the vanes have the proper curvature for the service to which they are to be applied, the segments 11 extending diagonally as shown in Fig. 2. At the same time the entire strip is bent to form a cylinder of such size that it can be fitted inside the rim 12 as shown in Fig. 5, the bent portion of the segments 11 fitting closely inside the flange of the rim 12 and the feet formed of the tabs 23 fitting against the inner radial surface of the rim 12. The feet 23 are then spot welded to the rim. It should be noted that when properly assembled the centrifugal force, tending to force the entire strip radially, is taken on the surface *x* of Fig. 5, the bent portion of the segment 11 pressing against the flange on the rim 12.

Our rotor construction thus considerably facilitates the manufacture of rotors for rotary blowers by permitting fabrication of the entire vane assembly from a single rectangular strip 16, the fabrication of the vanes 10, interconnecting segments 11, and tabs 23 involving only simple cutting and bending operations. If desired, the entire vane assembly may be fabricate.. by a simple stamping operation or operations as is well known in the art. When assembling the rotor. the tabs 23 may, for example, be spot-welded to the annular rims 12 as indicated at 27.

Although we have described a specific embodiment of our invention, we do not intend to be limited to the specific disclosures contained herein since various changes, modifications, and substitutions may be incorporated in the specific embodiment without departing from the spirit of the invention as defined by the appended claims.

We claim as our invention:

1. A rotor for a rotary blower including a plurality of adjacent elongated vanes having substantially parallel longitudinal axes, said vanes being disposed in spaced relationship along a circular line and being so positioned relative thereto that one longitudinal edge of each vane is disposed inwardly of the line and the other longitudinal edge thereof is disposed outwardly of the line to define a substantially cylindrical rotor having a longitudinal axis which is substantially parallel to the longitudinal axes of said vanes, adjacent ends of adjacent vanes being joined by narrow segments each of which is joined at one end to one vane and at the other end to an adjacent vane, said segments not having any connection with any other part of the rotor, each end of each vane having a separate radial tab which is formed integrally therewith and is substantially perpendicular to the longitudinal axes of said vanes.

2. In a rotor for a rotary blower, the combination of: a plurality of adjacent elongated vanes having substantially parallel longitudinal axes, said vanes being disposed in spaced relationship along a circular line and being so positioned relative thereto that one longitudinal edge of each vane is disposed inwardly of the line and the other longitudinal edge thereof is disposed outwardly of the line to define a substantially cylindrical rotor having a longitudinal axis which is substantially parallel to the longitudinal axes of said vanes, adjacent ends of adjacent vanes

being joined by narrow segments each of which is joined at one end to one vane and at the other end to an adjacent vane, said segments not having any connection with any other part of the rotor, each end of each vane having a separate radial tab which is formed integrally therewith and is substantially perpendicular to the longitudinal axes of said vanes; and a pair of annular rims, one of said annular rims being secured to said flanges on said vanes at one end of the rotor and the other of said annular rims being secured to said flanges on said vanes at the opposite end of the rotor.

3. As an article of manufacture, an elongated strip which is provided with longitudinally-spaced, transverse slits intermediate the longitudinal edges thereof to define vanes between adjacent transverse slits and is provided with substantially aligned and longitudinally-spaced longitudinal slits which are disposed adjacent and communicate with the ends of said transverse slits to define narrow segments each of which is joined at one end to one vane and at the other end to an adjacent vane, said strip being provided with a plurality of longitudinally spaced notches therein along each of its longitudinal edges to define a plurality of longitudinally spaced tabs along each of its longitudinal edges.

4. As an article of manufacture, an elongated strip which is provided with longitudinally-spaced, transverse slits intermediate the longitudinal edges thereof to define vanes between adjacent transverse slits, is provided with substantially aligned and longitudinally-spaced longitudinal slits which are disposed adjacent and communicate with the ends of said transverse slits to define narrow segments each of which is joined at one end to one vane and at the other end to an adjacent vane, and is provided with notches in the longitudinal edges thereof adjacent the ends of said transverse slits to define separate radial tabs which extend from the ends of said vanes, said segments being bent relative to said vanes along lines which are substantially parallel to said transverse slits, and said tabs being bent relative to said vanes along lines which are substantially perpendicular to said transverse slits.

5. As an article of manufacture, a substantially recangular strip having a longitudinal axis, said strip being provided with longitudinally-spaced transverse slits intermediate the longitudinal edges thereof to define vanes between adjacent transverse slits, said transverse slits being substantially perpendicular to said longitudinal axis, said strip being provided with substantially aligned and longitudinally-spaced longitudinal slits which are disposed adjacent and communicate with the ends of said transverse slits to define narrow segments each of which is joined at one end to one vane and at the other end to an adjacent vane, said longitudinal slits being substantially parallel to said longitudinal axis, and said segments being bent relative to said vanes along lines which are substantially perpendicular to said longitudinal axis, said strip being provided with a plurality of longitudinally spaced notches therein along each of its longitudinal edges to provide a plurality of longitudinally spaced tabs along each of its longitudinal edges, said tabs being bent relative to said vanes along lines which are substantially perpendicular to said transverse slits.

6. In a rotor for a rotary blower, a series of vanes, each of said vanes being formed of plane sheet material, each of said vanes being bent

to form an air propelling surface, each of said vanes having an independent tab formed on each end thereof, each of said tabs being bent at right angles to the plane of the sheet, and a series of independent segments formed from said sheet, each of said segments connecting two adjacent vanes, but not being otherwise connected to any portion of the rotor.

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