Jan. 4, 1949. J. H. WESSEL 2,458,041

ROTOR

Filed July 14, 1945

Fig. 1

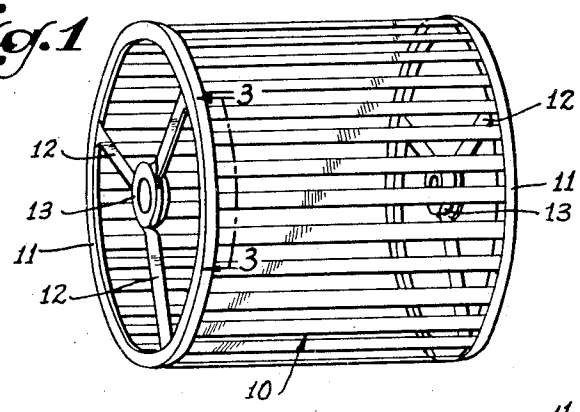


Fig. 3

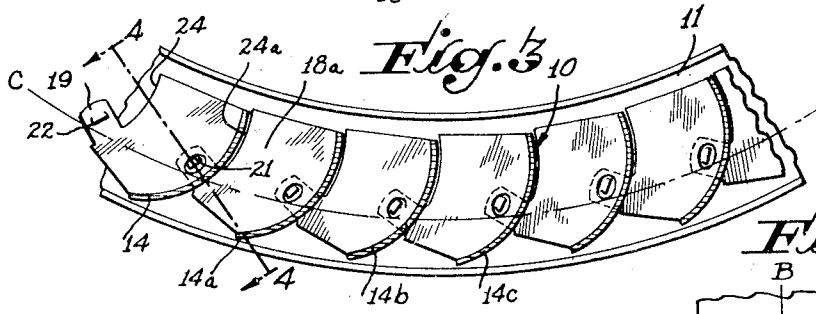


Fig. 2

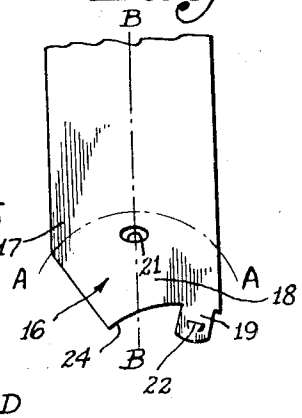


Fig. 4

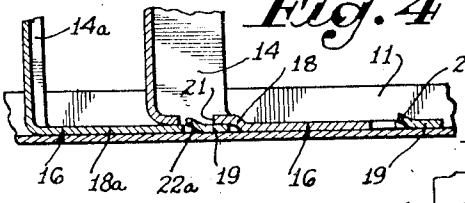


Fig. 5

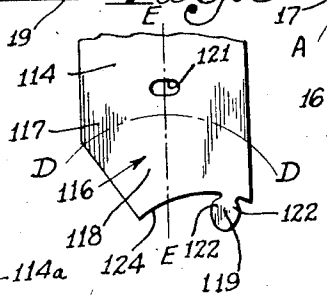


Fig. 6

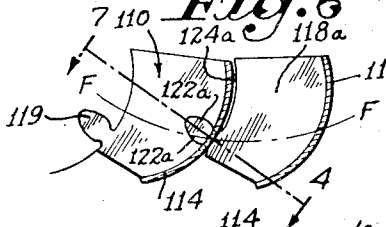
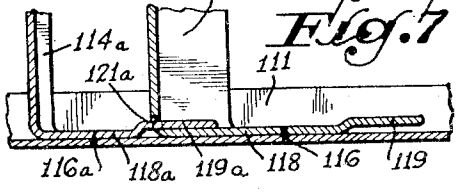


Fig. 7



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ROTOR

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9 Claims. (CL 230—134)

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My invention relates in general to a rotor for rotary, or centrifugal blowers and, more specifically, to the structure and fabrication of a vane which is adapted for assembly with similar vanes to provide the rotor. For the purpose of disclosing the invention, the present specification relates to an application of my fundamental concepts to a cylindrical rotor wherein the longitudinal axes of the vanes are parallel to the longitudinal axis of the rotor.

One of the primary objectives of my invention is the provision of a rotor which includes a plurality of adjacent, individual vanes, each vane being adapted for interlocking engagement with an adjacent vane. I prefer to effect a realization of this objective by providing each vane with a flange portion adjacent each end thereof, the flange portions of each vane preferably being formed integrally therewith and being adapted for interlocking engagement with an adjacent vane. Conventional rotors employing individual vanes are ordinarily assembled by individually securing each vane to suitable supporting members, the supporting members frequently being annular rims, for example. Assembly of the various components of such conventional rotors also necessitates individually positioning each vane relative to the supporting members. My invention materially facilitates assembly operations by providing for interlocked assembly of the vanes prior to securing the vanes to the supporting members, the entire vane assembly being securable to the supporting members as a single unit.

Another primary objective of my invention is the provision of a vane having flange portions which include base sections adjacent the vane and end, or locking sections, adjacent the base sections, the end sections being adapted for engagement with an adjacent vane to interlock the vanes. I prefer to employ flange portions wherein the end sections are displaced relative to the base sections, or relative to portions thereof, to permit each end section of one vane to accommodate the corresponding base section of an adjacent vane.

An objective of my invention in connection with one embodiment thereof is the provision of a vane having flange portions with base and end sections which are displaced relative to each other, each base section having an opening therethrough which is adapted for the reception of a locking projection on an end section of an adjacent vane to interlock the vane.

An objective of my invention in connection with another embodiment thereof is the provision of

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a vane having flange portions with base and end sections which are displaced relative to each other, the vane having an opening therethrough adjacent each end thereof and substantially adjacent each flange portion, each of the openings being adapted to receive an end section of an adjacent vane to lock the vanes together.

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

Fig. 1 is a perspective view of a rotor which embodies the fundamental concepts of my invention;

Fig. 2 is a plan view of a partially completed vane and illustrates various steps involved in the fabrication thereof;

Fig. 3 is a fragmentary transverse sectional view taken as indicated by the broken line 3—3 of Fig. 1 and illustrates an embodiment of my invention which includes the vane shown in Fig. 2;

Fig. 4 is a sectional view taken along the broken line 4—4 of Fig. 3;

Fig. 5 is a view which is similar to that of Fig. 2, but illustrates another embodiment of the vane;

Fig. 6 is a view which is similar to that of Fig. 3, but illustrates the embodiment of my invention which includes the vane shown in Fig. 5; and

Fig. 7 is a sectional view taken along the line 7—7 of Fig. 6.

The rotor includes a vane assembly which is indicated generally by the numeral 10, the vane assembly 10 being secured to annular rims 11. The rims 11 are secured to spiders 12 which include hubs 13, the latter being adapted for rotatably mounting the rotor in the conventional manner.

Referring particularly to Figs. 2 through 4, the vane assembly 10 includes a plurality of adjacent vanes 14 which are interlocked in a manner that will be described in detail hereinafter. As best shown in Fig. 2, the vane 14 may be cut from a plane member, such as sheet metal, and is provided with a flange portion 16 adjacent each end 17 thereof, only one flange portion 16 and vane end 17 having been shown since the vane 14 is symmetrical.

The flange portion 16 is preferably formed integrally with the vane 14 and includes a base section 18 adjacent the vane 14 and an end, or locking section 19, adjacent the base section 18. The base section 18 is provided with an opening

21 therethrough and the end section 19 is provided with a locking projection 22 thereon, the end section 19 having been cut to define the locking projection 22 which is then bent relative to the end section 19 as best shown in Fig. 4.

The vane 14 is bent to provide the arcuate cross-sectional configuration thereof which is best shown in Fig. 3 and the flange portion 16 is bent substantially along the line A—A of Fig. 2 until the flange portion 16 is substantially perpendicular to the longitudinal axis B—B of the vane 14. A portion 23 of the base section 18 adjacent the opening 21 is bent relative to the remainder thereof so that the end section 19 is displaced relative to the base section 18 in a direction which is substantially parallel to the longitudinal axis B—B.

For convenience in describing the assembly of the vane 14 with an adjacent vane which is identical thereto, the adjacent vane and the corresponding components thereof shall be designated by the addition of the letter "*a*" to the identifying numerals used to indicate the vane 14 and the components thereof. As best shown in Fig. 4, the vane 14 is inserted between the end sections 19*a* of the vane 14*a* until the locking projections 22*a* are inserted into and engage the peripheries of the openings 21 in the base sections 18 of the vane 14, the resilience of the flange portions 16*a* tending to maintain the engagement. The ends 17 of the vane 14 also abut edges 24*a* of the base section 18*a* of the vane 14*a* as best shown in Fig. 3, the curvature and orientation of the edges 24*a* being such that the longitudinal axes of the vanes 14 and 14*a* intersect a circular line C—C. Additional vanes 14*b*, 14*c*, etc. may be assembled in a similar manner to provide the vane assembly 10. The entire vane assembly 10 may then be attached to the annular rims 11 by riveting or welding the flange portions 16, 16*a*, etc. thereto, although it will be understood that any other suitable attachment means may be employed as is well known in the art.

The embodiment of my invention which is illustrated in Figs. 5 to 7, inclusive, is similar to the embodiment which was described previously and includes vanes which shall be designated by the numeral 114. Similarly, the components of the vane 114 shall be designated by the numerals which differ from the identifying numerals of the corresponding components of the vane 14 by the addition of the numeral "100" thereto.

As best shown in Fig. 5, the vane 114 includes an integral flange portion 116 adjacent each end 117 thereof, only one end 117 having been shown since the vane 114 is symmetrical. The flange portion 116 includes a base section 118 adjacent the vane 114 and an end, or locking section 119, adjacent the base section 118. The vane 114 is provided with an opening 121 therethrough adjacent the end 117 thereof and substantially adjacent the flange portion 116. The end section 119 is provided with lateral locking projections 122 thereon and is displaced relative to the base section 118 as best shown in Fig. 7.

The cross-sectional arcuation of the vane 114 is similar to that of the vane 14 and the flange portion 116 is bent substantially along the line D—D until substantially perpendicular to the longitudinal axis E—E of the vane 114.

The vane 114 may be assembled with an identical adjacent vane which shall be designated 114*a*, the components of the vane 114*a* being designated by the addition of the letter "*a*" to the numerals which identify corresponding components of the

vane 114. As best shown in Fig. 7, the end sections 119*a* of the vane 114*a* are inserted into the openings 121 in the vane 114, the displacement of the end sections 119*a* being adapted to accommodate the base sections 118 of the vane 114. The locking projections 122*a* on the end sections 119*a* engage the periphery of the openings 121 to retain the end sections 119*a* therein, thus interlocking the vanes 114 and 114*a*. The vane 114*a* is provided with base sections 118*a* having edges 124*a* which are adapted to abut the ends 117 of the vane 114 as best shown in Fig. 6, the curvature and orientation of the edges 124*a* being such that the vanes 114 and 114*a* are disposed along a circular line F—F. Additional identical vanes (not shown) may be added in a similar manner to provide a vane assembly 110 which may then be attached to rims 111 in any suitable manner.

If desired, the vanes 14 and 114 may be formed by a stamping operation, or operations, as is well known in the art. The individual vanes 14 and 114 may be assembled easily and rapidly in the manner described to provide interlocked vane assemblies 10 and 110, respectively, which may then be secured to suitable supporting members such as the annular rims 11 and 111, respectively. My invention avoids any necessity for individually positioning vanes relative to supporting members and thereby materially accelerates assembly operations.

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

I claim as my invention:

1. A vane for a rotor, said vane having a flange portion formed integrally therewith adjacent each end thereof, each of said flange portions including a base section adjacent said vane and an end section adjacent said base section, each of said base sections having an opening therethrough and each of said end sections having a locking projection thereon, said locking projections being located in positions complementary to said openings, respectively.

2. A vane for a rotor, said vane having a flange portion formed integrally therewith adjacent each end thereof, each of said flange portions including a base section adjacent said vane and an end section adjacent said base section, said vane having an opening therethrough adjacent each end thereof, said openings being substantially adjacent said flange portions and being complementary to said end sections, respectively.

3. A rotor for a rotary blower including a plurality of adjacent vanes, each of said vanes having a flange portion formed integrally therewith adjacent each end thereof, each of said flange portions of each vane including a base section adjacent said vane and an end section adjacent said base section, each of said base sections having an opening therethrough, and each of said end sections of one vane being adapted for engagement with one of said openings in said base sections of an adjacent vane to interlock said vanes.

4. A rotor for a rotary blower including a plurality of adjacent vanes, each of said vanes having a flange portion formed integrally therewith adjacent each end thereof, each of said flange portions of each vane including a base section adjacent said vane and an end section adjacent said

base section, each of said base sections having an opening therethrough, and each of said end sections having a locking projection thereon, each of said locking projections on said end sections of one vane being adapted for insertion into one of said openings in said base section of an adjacent vane to interlock said vanes.

5. A rotor for a rotary blower including a plurality of adjacent vanes, each of said vanes having a flange portion formed integrally therewith adjacent each end thereof, each of said flange portions of each vane including a base section adjacent said vane and an end section adjacent said base section, and each of said vanes having an opening therethrough adjacent each end thereof, said openings being substantially adjacent said flange portions, and each of said end sections of one vane being adapted for insertion into one of said openings in an adjacent vane to interlock said vanes.

6. A rotor providing an axis of rotation and including a plurality of vanes extending parallel to said axis, each of said vanes being provided with an opening and being provided with a locking element, said locking element of each of said vanes being insertable into said opening in another of said vanes to interlock said vanes.

7. A rotor including a plurality of circumferentially spaced, longitudinally extending vanes each of which is provided with an opening adjacent each end thereof and each of which is provided with a transversely extending locking projection adjacent each end thereof, said locking projections of each vane being disposed in the openings in an adjacent vane to interlock said vanes.

8. A vane of arcuate cross section having a flange extending transversely therefrom, said flange having an arcuate edge spaced from and substantially parallel to said vane, said vane having an opening therein and said flange having a locking projection thereon located in a position complementary to said opening, the width of said flange being less than the width of said vane.

9. A rotor including a plurality of circumferentially spaced, longitudinal vanes of arcuate cross section, each of said vanes being provided with an opening and being provided with a transverse flange, each of said flanges being provided with a locking projection and being provided with an arcuate edge which is spaced from and is substantially parallel to the corresponding vane, each of said arcuate edges engaging an adjacent vane to establish a predetermined spacing between said vanes, and each of said locking projections being disposed in the opening in an adjacent vane to interlock said vanes.

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