Sept. 21, 1926. 1,600,690

A. MEYER

ROTARY BLOWER OR COMPRESSOR

Filed June 7, 1926

Fig. 1.

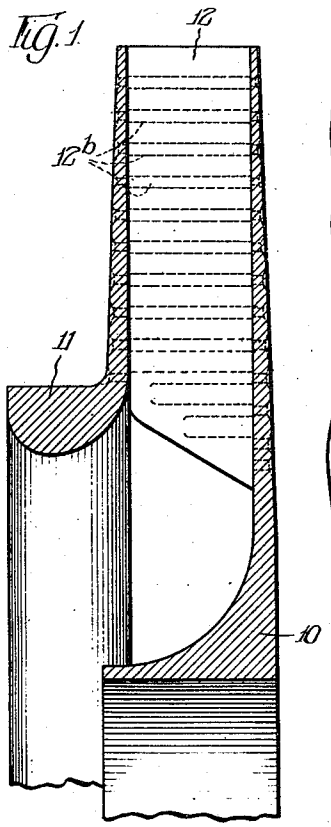


Fig. 2.

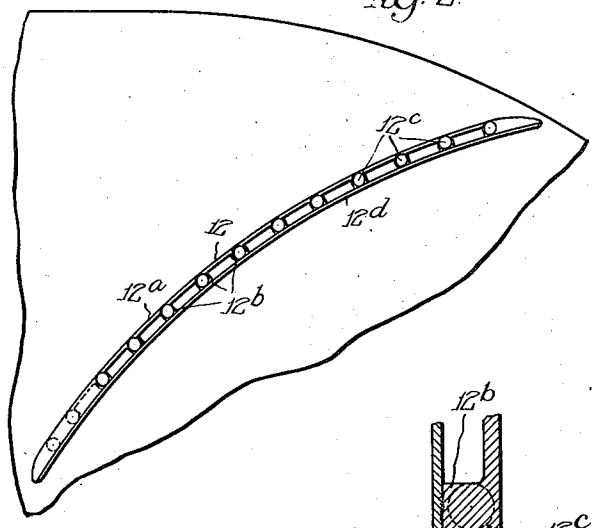


Fig. 3.

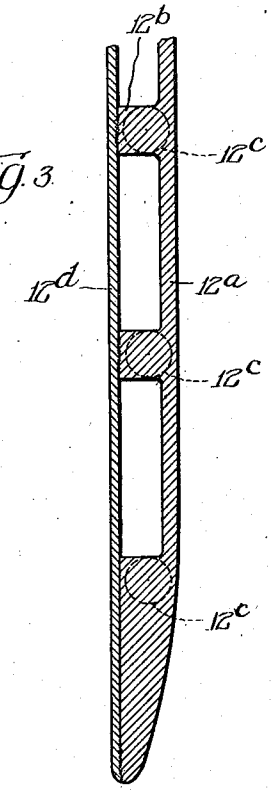
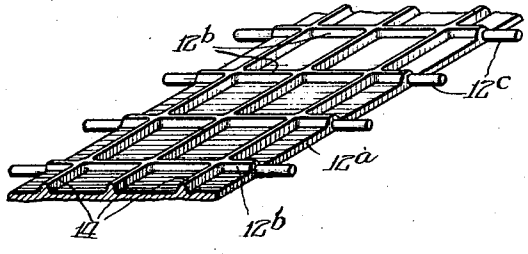


Fig. 4.



Inventor:
Adolf Meyer,
By Cromwell Bair & Crowder
Attys.

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UNITED STATES PATENT OFFICE.

ADOLF MEYER, OF KUSNACHT, NEAR ZURICH, SWITZERLAND, ASSIGNOR TO AKTIENGESELLSCHAFT BROWN BOVERI & CIE., OF BADEN, SWITZERLAND, A JOINT STOCK COMPANY OF SWITZERLAND.

ROTARY BLOWER OR COMPRESSOR.

Application filed June 7, 1926, Serial No. 114,065, and in Germany May 2, 1925.

This invention relates to the construction of rotary blowers or compressors of the type operating on the centrifugal or centripetal principles.

The general purpose of the invention is the provision of a construction which will contribute to the operation of such machines at increased efficiencies, and which will contribute to economy in cost through reduction of the amount of material requisite in the rotating members and associated parts.

A particular object of the invention is the provision of a construction which will permit a reduction in the amount of material requisite in the shroud discs for sustaining high speed operation.

Another specific object of the invention is the provision of a construction which will afford a very secure connection between the shroud discs through the medium of the blades.

Another general object is the provision of a construction which will increase the factor of safety in such machines.

A further object is the provision of a construction which will facilitate manufacture and assembly.

Another object is the provision of a construction which will contribute to conservation in the amount of space requisite for the various parts of the machine and the machine as a whole.

An additional object is the provision of an improved and advantageous blade construction.

Other and further objects will be pointed out or indicated hereinafter or will be apparent to one skilled in the art upon an understanding of the invention.

In the accompanying drawing forming a part of this specification, I illustrate certain fashions in which the invention may be embodied, but it is to be understood that the invention as claimed is not limited to these particular forms.

In the drawings,

Fig. 1 is a part sectional elevational view of a wheel construction for a rotary compressor of the centrifugal type, the section being taken on a radius of the wheel;

Fig. 2 is a detail in the nature of a part section of a wheel taken in a plane transverse of its axis and showing one of the blades in side elevation;

Fig. 3 is an enlarged detail illustrating an end portion of a blade in longitudinal section, and

Fig. 4 is a detail showing in perspective a portion or section of a blade part.

Limitations are imposed upon the speed at which the rotary parts of rotary compressors may be operated, by the stresses imposed on the discs, the blades and blade mountings. A high peripheral speed with wheels of substantial diameter necessitates comparatively thick blades, the weight of which owing to centrifugal action and air pressures, sensibly affects the side discs and, to a degree, the shaft and shaft bearings. Considerations of design and critical speed limit the length of the shafts, with the result that increase in the thickness of the discs to carry heavy blades may undesirably limit the number of wheels which may be mounted on a shaft.

The present invention is designed to permit a desirable lightening of the discs, and at the same time permit operation at high peripheral speeds, and is accomplished primarily through the use of a special blade construction which accomplishes not only a decrease in weight and resulting centrifugal stresses, but forms a very strong and stable connection between the shroud discs forming a unitary wheel. The nature of the invention will be most quickly ascertained by reference to the illustrative forms shown.

As shown in the drawings, the reference numerals 10 and 11 designate the shroud discs of a wheel of a rotary compressor, the disc 10 being arranged for mounting upon a shaft by which the wheel is sustained and rotated. These discs are spaced apart and connected by blades 12 extending in generally involute direction.

The construction of the blades constitutes a feature of the invention. The principal member of the blade structure is a body portion 12^a which may be formed as a casting or pressing of strong metal, presenting a wall of the proper width with upstanding transverse rib 12^b on one side. Portions of the material at the ends of the ribs are prolonged beyond the margins of the wall portion to form attaching rivets 12^c. The body member may be formed integrally throughout the length of the blade or subdivided into a plurality of blade sections. A wall portion 12^d is provided over the tops

of the ribs 12^b, said wall portion being of the same width as the wall portion 12^a. The wall portion 12^d may be formed of sheet metal securely attached to the tops of the ribs and to the end portions of the body member by electrical welding, as illustrated in Fig. 3. The blade construction thus affords a hollow structure of relatively light weight in comparison to a solid structure of equal size. The blades are mounted between the shroud discs 10 and 11 by inserting the rivets through holes drilled in the discs and upsetting the ends of the rivets at the outer faces of the discs. Thus the discs are bound tightly against the margins of the body portion and the end portions of the ribs about the rivets, the blades thus forming spacers and strong connecting mountings for the discs. Some of the most serious bending moments to which the blades of rotary compressor wheels are subjected, and those which the structure as a whole is least qualified to sustain, tend to produce a bending of the blades along a longitudinal line. By virtue of the present construction, the blades are effectively stayed against these bending moments, and the lightening of the discs permitted by the lighter blade construction here afforded operates in some degree likewise to decrease these bending moments. The lightening of the blades decreases the stresses on the rivets resulting from centrifugal force in the operation of the wheel, and consequently upon the material in the discs which supports the rivets, thus permitting the lightening of the discs, with consequent saving of space on the shaft. The construction, in addition to possessing the desirable features of lightness and strength, affords smooth outer wall surfaces which minimize losses from windage and friction.

The construction may be varied in particulars, such as by the addition of longitudinal ribs 14 as illustrated in Fig. 4, and the cover wall 12^d may be welded to the tops of these as well as to the transverse ribs, if desired.

What I claim is:

1. In a compressor wheel, the combination with side discs, of hollow blades with their margins contacting the faces of the discs, and means securing the blades to the discs.

2. In a compressor wheel, the combination with the wheel discs, of hollow blades between the discs, said blades having transverse ribs contacting the inner faces of the discs, and means securing the blades to the discs.

3. A compressor wheel, comprising, in combination, discs, hollow blades between the discs and rivets extending from the margins of the blades and seated in the discs to hold the latter in contact with the blade margins.

4. A blade for rotary compressors comprising wall portions with intervening transversely extending ribs connecting the wall portions in spaced relationship.

5. A blade for rotary compressors comprising wall portions with transversely extending ribs connecting the wall portions in spaced relationship and securing members at the ends of the ribs.

6. Blade construction for rotary compressor wheels comprising wall portions, transversely extending ribs connecting the wall portions in spaced relationship and rivets formed at the ends of the ribs.

7. Blade construction for rotary compressor wheels comprising a body portion formed with ribs projecting from one side, a cooperating wall portion secured to the tops of the ribs and marginal connecting means.

8. Blade construction for rotary compressor wheels comprising a wall portion formed with transverse ribs and rivets projecting beyond the margins of the wall portion, and a cooperating wall portion secured to the tops of the ribs.

9. A blade construction for rotary compressor wheels comprising cooperating wall portions arranged in spaced relationship, spacing members between the wall portions and secured thereto, and attaching members projecting from the ends of the spacing members.

In testimony whereof I have hereunto subscribed my name at Camden, N. J., on the 3rd day of June A. D. 1926.

ADOLF MEYER.

DISCLAIMER

1,600,690.—*Adolf Meyer,* Kusnacht, near Zurich, Switzerland. ROTARY BLOWER OR COMPRESSOR. Patent dated September 21, 1926. Disclaimer filed March 26, 1932, by the assignee, *Aktiengesellschaft Brown Boveri & Cie.*

Hereby enters this disclaimer to claims 2, 4, 7 and 9 of the said Letters Patent, to wit:

"2. In a compressor wheel, the combination with the wheel discs, of hollow blades between the discs, said blades having transverse ribs contacting the inner faces of the discs, and means securing the blades to the discs."

"4. A blade for rotary compressors comprising wall portions with intervening transversely extending ribs connecting the wall portions in spaced relationship."

"7. Blade construction for rotary compressor wheels comprising a body portion formed with ribs projecting from one side, a cooperating wall portion secured to the tops of the ribs and marginal connecting means."

"9. A blade construction for rotary compressor wheels comprising cooperating wall portions arranged in spaced relationship, spacing members between the wall portions and secured thereto, and attaching members projecting from the ends of the spacing members."

[*Official Gazette April 19, 1932*]