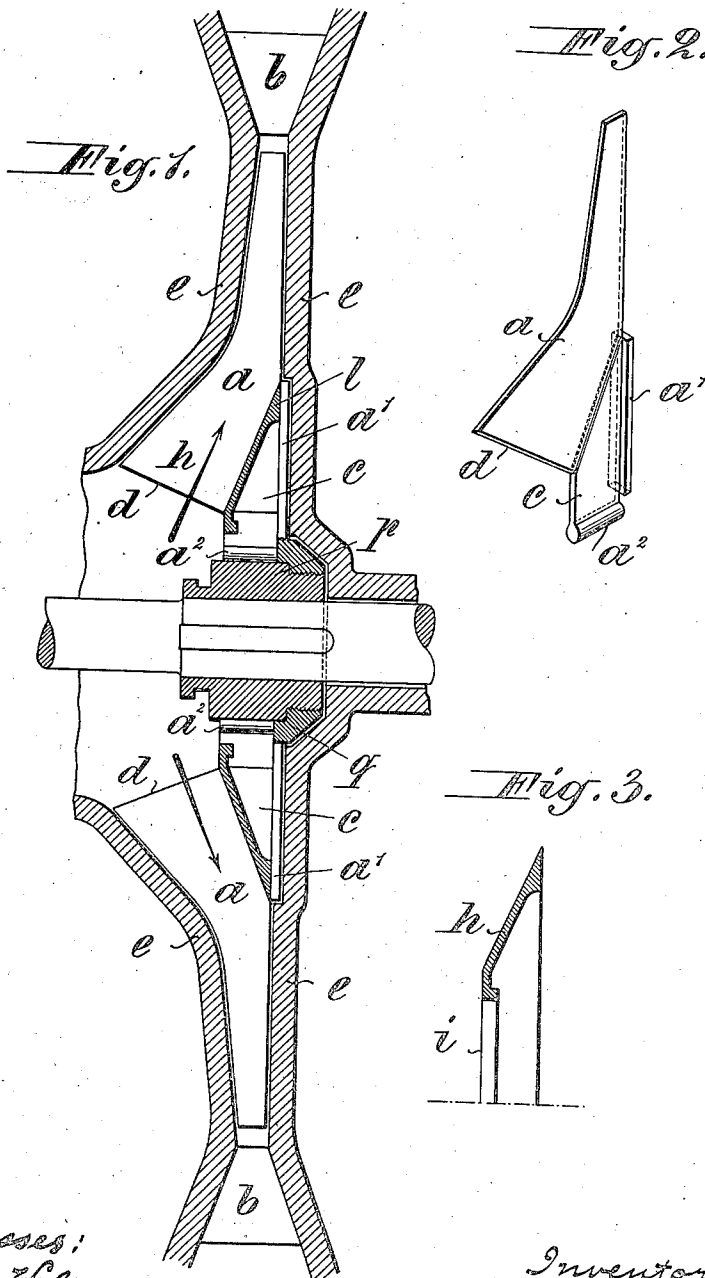


A. HUGUENIN.
CONSTRUCTION OF ROTATING WHEELS FOR ROTARY FLUID COMPRESSORS.
APPLICATION FILED NOV. 5, 1907.

958,129.

Patented May 17, 1910
2 SHEETS—SHEET 1.



Witnesses:
H. Lee Philips
Mary S. Hardy.

Inventor:
Albert Huguenin
By Maxwell Bailey
His Attorney.

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Fig. 4.

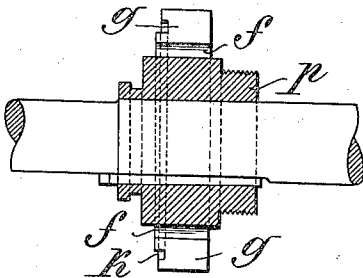


Fig. 4a.

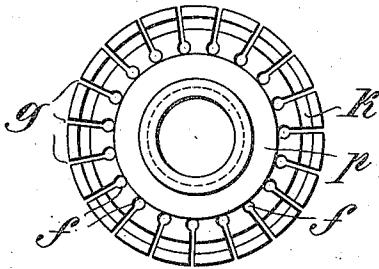


Fig. 3a.

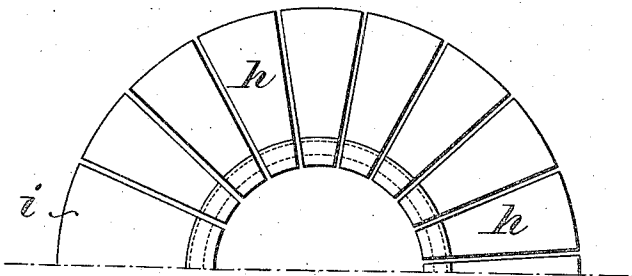
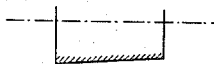


Fig. 5.



Witnesses:
H. Lee Helms
Mary S. Handy.

Inventor:
Albert Huguenin
By *Marcellus D. Day*
His Attorney

UNITED STATES PATENT OFFICE.

ALBERT HUGUENIN, OF ZURICH, SWITZERLAND.

CONSTRUCTION OF ROTATING WHEELS FOR ROTARY FLUID-COMPRESSORS.

958,129.

Specification of Letters Patent.

Patented May 17, 1910.

Application filed November 5, 1907. Serial No. 400,808.

To all whom it may concern:

Be it known that I, ALBERT HUGUENIN, of Zurich, a citizen of Switzerland, and whose post-office address is 33 Universitätsstrasse, Zurich, Switzerland, have invented new and useful Improvements in the Construction of Rotating Wheels for Rotary Fluid-Compressors, of which the following is the specification.

This invention relates to improvements in the construction of the radial wheels for rotary fluid compressors, having a cylindrical or pyramidal slot surface concentric with the axis of rotation. As is well known these wheels have the great advantage of enabling the elastic fluid to be compressed without the production of shocks or eddies. It is well known that the use of shrunk rings for holding the single blades or arms of the wheel involve the drawbacks that they have to be arranged at both sides of the blades and made cylindrical; and, for the purpose of leaving free a sufficiently large inlet cross section, they must be made of such large diameter that their speed of rotation leaves a very small margin of safety. In that way a very heavy construction is produced which must be considered impracticable owing to the fact that the most important part of the structure affords the smallest degree of safety. In addition to that it is of course necessary to provide a hub for driving the two rings and the arms.

In the accompanying drawings which illustrate apparatus embodying this invention:—Figure 1 is a central section of a rotary fluid compressor; Fig. 2 is a perspective view of one of the arms or blades; Fig. 3 is a section of certain insertions or spacers and Fig. 3^a is an elevation of the same; Fig. 4 is a central section of the hub portion of the device, and Fig. 4^a is an elevation of the same; Fig. 5 is a detail showing the angle at which the blades are cut.

In addition to the disadvantages already referred to above, if it is desired to make the hub a carrying element, the following difficulties are met with (see Fig. 1): By the one sided inlet an entirely unsymmetrical blade surface a is caused so that the resultant of the centrifugal force on the blades is situated outside the central radial line of the outlet channel and of the adjoining diffuser b . The blades in themselves must, however, be held in a projection c which is flush with the right hand side of the blade surface a ,

this being absolutely necessary for practical reasons in erecting. As, on the other hand the longitudinal extent of the projection c is limited by the length of the inlet edge d of the blades, determined by the quantity to be handled, it will be seen at once that the radial central line (or central plane) of the said projection c will not coincide with the direction of the resultant centrifugal force of the whole arm. This results therefore in the projection c having to withstand not only the tension corresponding to the centrifugal force, but also a bending moment which is transmitted direct to the hub. This condition is not only undesirable having regard to dimensions of the said important parts, but it is also very dangerous as any small deformation at once results in a reduction of the axial clearance between the blade surface a and the fixed wall e which would considerably decrease the safety of working.

This invention consists in the formation of the arm in such a way that notwithstanding the use of a one-sided inlet and a pyramidal slot surface, the resultant of the centrifugal force on the arms as a whole is arranged to coincide exactly with the radial central line (or radial central plane) of the projection c . This result is obtained in the following manner: The blade surface a is machined on both sides in the direction of the arrow shown in Fig. 1, by means of a milling cutter, the cutting edge of which is inclined as shown in Fig. 5, and the blade surface thus receives a thickness gradually decreasing outward from the projection c in a direction transversely to the advance of the work. By a suitable method of guiding, provision is made for a continual decrease in the thickness of the blade from the inlet to the outlet edge. In that way the resultant of the centrifugal force of the blades alone is shifted as much as possible to the right in Fig. 1. In order to balance the arm completely, that is to say to bring the total resultant centrifugal force to coincide with the radial central plane of the projection c (which is of the same thickness throughout) each blade is provided on the right hand side with a thickened portion a' , the centrifugal force of which effects the desired equalization. In that way any bending moment on the projection c is avoided. The blade is held in the hub p by means of a cylindrical thickened portion a^2 engag-

ing with a corresponding recess f in the hub. The arm is shown separately in Fig. 2 in perspective. The hub p has a cross section shown in Fig. 4 and is provided with perforations f and slots g for receiving the single arms. In order to give the whole construction of the wheel the necessary rigidity in a circumferential direction, more particularly in order to avoid as far as possible any vibration, insertions or spacers h are placed between the arms, which spacers on the one hand are held in the groove k of the hub and on the other hand are screwed at l to the boss of the arm, whereby each spacer is forced strongly against the two arms and at the same time the spacers form the limit of the fluid conduit toward the hub. These spacers h are obtained by cutting a disk i of the required cross section (see Fig. 3). The thickened portions or bosses a' of the arms secure them against movement to the left (Fig. 1) they being restrained against movement in this direction by the hub p , the slots g in which are too narrow to permit their passage, and at the same time they are prevented from moving to the right by the nut q screwed on the hub p . The method of keying and longitudinally fixing the wheel on the shaft renders any collars and any screw thread superfluous and makes it possible with a small alteration in the diameter of the shaft, to assemble and take to pieces the single wheels of a

multiple compressor in an easy and reliable manner. This method of keying and longitudinally securing the wheel constitutes a feature of this invention as being part of the construction of the whole wheel. 35

What I do claim, and desire to secure by Letters Patent of the United States, is— 40

1. In a rotating compressor, the combination with blades gradually decreasing in section outward and lengthwise, of lateral triangular projections attached to a hub, to which said blades are secured, of spacers located between the blades and of a case adapted to receive the wheel composed by the hub, the projections and the blades, substantially as set forth. 45

2. In rotating compressors the combination with blades gradually decreasing in section outward and lengthwise, of lateral triangular projections attached to the hub, to which said blades are secured, of sector-shaped spacers separated from one another by radial slots which receive the blades, and of a case adapted to receive the wheel composed by the hub the projections and the blades, substantially as set forth. 50

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses. 55 60

ALBERT HUGUENIN.

Witnesses:

A. LIEBERKNECHT,
ALFR. WIESTAND.