United States Patent

[11] **3,612,723**

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[21] Appl. No. **13,932**
[22] Filed **Feb. 25, 1970**
[45] Patented **Oct. 12, 1971**

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The Hague, Netherlands

[32] Priority **Feb. 25, 1969**
[33] **Netherlands**
[31] **6902892**

[54] **CENTRIFUGAL FLUID VANES COMPRESSOR**
2 Claims, 2 Drawing Figs.

[52] **U.S. Cl.** **417/67,** 417/77, 261/29
[51] **Int. Cl.** **F04f 11/00,** F04d 17/18
[50] **Field of Search** 417/67, 77, 78, 171; 261/29

[56] **References Cited**
UNITED STATES PATENTS

1,266,344	5/1918	Suczek	417/67
1,361,190	12/1920	Skidmore	417/67
1,994,450	3/1935	Carpenter	417/67
3,046,732	7/1962	Foa	417/171
3,262,682	7/1966	Bredberg	261/29

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ABSTRACT: The invention relates to a centrifugal fluid vanes compressor wherein a driven rotor is provided with jet channels for supply of liquid which on rotation form liquid vanes effecting a compressive action upon a gaseous medium between two parallel walls bounding the space for the fluid vanes. It is a feature of the invention that at least one of the said parallel walls can rotate freely and concentrically with the rotor and that a ring of blades is mounted perpendicular to the surface of said wall and substantially at its periphery, the said blades being bent backward with respect to the direction of rotation of the driven rotor so as to cooperate with the fluid vanes, said blades being interconnected over their entire fronts by a wire mesh screen which bounds the discharge of the compressed gaseous medium.

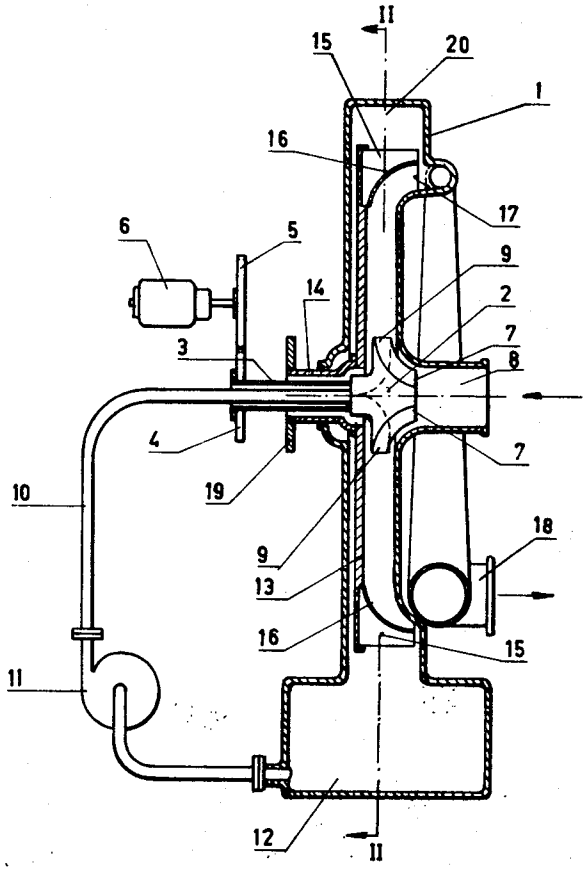

FIG. 1

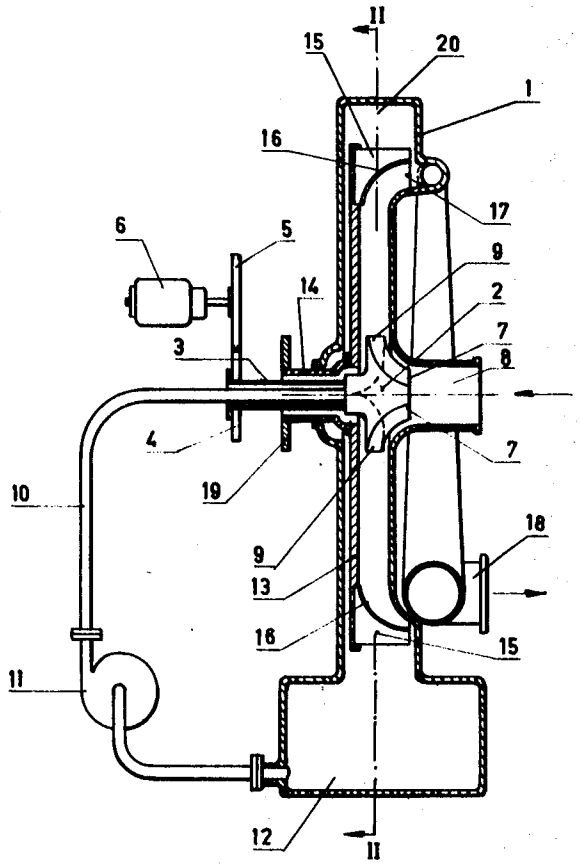

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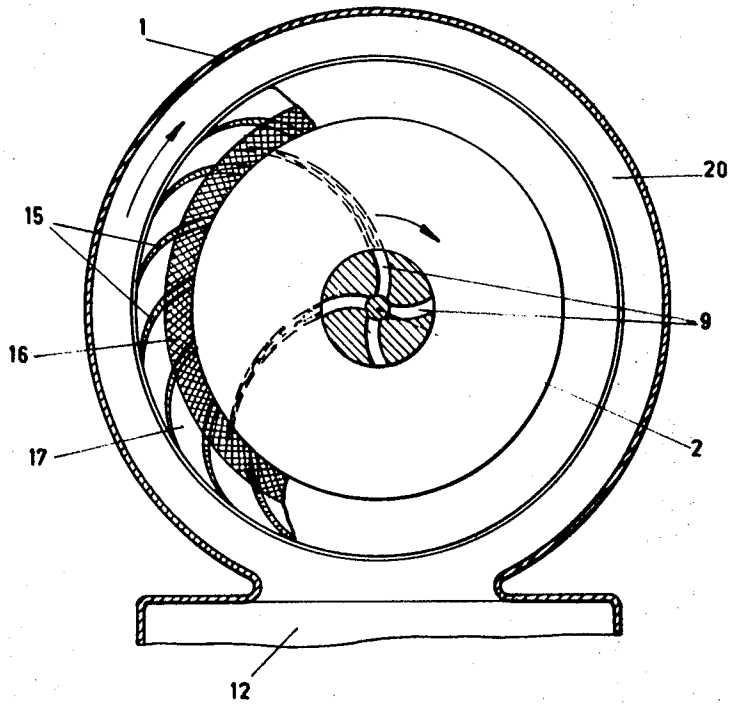
FIG. 2



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CENTRIFUGAL FLUID VANES COMPRESSOR

The invention relates to a centrifugal fluid vanes compressor for compressing a gaseous medium.

Such compressors are known in the art. A driven rotor provided with jet channels to which fluid is supplied , forms between two fixed, parallel walls, fluid vanes bent backward, by means of which in the same way as at a centrifugal compressor provided with metal blades a gaseous medium can be compressed.

In such fluid vanes the thickness of the vanes decreases with increasing diameter, until the coherence is lost and the fluid vanes disintegrate.

The vanes may also be bent so far backward, before they reach the moment of disintegration that they block the passage and render any further compressing of the gaseous medium impossible. Consequently from this it follows that above a certain diameter the fluid vanes are no longer useful and vanish. As a rule this fluid still contains a large amount of kinetic energy, which is lost therewith, too.

It is an object of the invention to provide an improved centrifugal fluid vanes compressor for compressing a gaseous medium.

For this purpose the discharge of the compressed gaseous medium is effected at the diameter where the fluid vanes will no longer be active.

Another object of the invention is to provide an improved centrifugal fluid vanes compressor having means to recover the excess of fluid energy at that diameter.

For this purpose one or both of the parallel walls are arranged to rotate freely and concentrically with the rotor and alongside their peripheries are provided with a ring of blades and the compressed gaseous medium is discharged laterally within the said ring of blades. A very large part of the excess energy at that diameter still present in the fluid vanes is drawn from the fluid by means of the ring of blades, the speed of the wall or walls acting as a secondary rotor possibly being much lower than the speed of the driven primary rotor.

Still another object of the invention is to provide an improved centrifugal fluid vanes compressor having means to improve the separation of fluid and compressed gaseous medium.

For this purpose the fronts of the blades are interconnected by a wire mesh screen, giving an efficient partition for a lateral discharge of the gaseous medium.

For the fluid this screen constitutes only a slight obstruction, while a fluid film sealing the wire mesh screen will always be present, causing the gaseous medium that is to be discharged laterally, and the velocity of which at that diameter being more tangential directed than that of the liquid, still more to be forced to flow past the wire mesh screen.

Because of the centrifugal effect however hardly any fluid will be able to remain in the wire mesh screen. At sufficient excess of fluid energy it is possible to have the rotatable wall emit power. When the fluid has only very little energy at the diameter where the gas has to be discharged from the compressor, with that energy the rotatable sidewall can be driven with it, which results in a good separation of gaseous medium and fluid without this rotating wall emitting power.

It is also possible to gave the blades on the wall such a shape that only that part of the energy remaining in the fluid is absorbed that is required to have the rotatable wall rotate at a certain speed without emission of power.

The separation of the gaseous medium and the fluid can still be improved by choosing the blade-height of the blades on the wall larger than the height of the fluid vanes. Thus any fluid still being present in the gaseous medium in the bend of the gas discharge, gets into the wire mesh screen after all and is flung into the water discharge by the rotating ring of blades.

An additional advantage of the rotating wall is that the fluid remaining thereupon by the friction with the fluid vanes, is rapidly discharged by centrifugal effect.

Other objects and advantages of the invention will hereinafter more fully appear from the following description and the accompanying drawings, in which by way of example:

FIG. 1 is a cross section of an embodiment.

FIG. 2 is a view taken through the line II—II of FIG. 1.

In housing 1 of a centrifugal fluid vanes compressor a driven rotor 2 is provided mounted on a hollow shaft 3, provided with a cogwheel 4, which is driven by an electromotor 6 via a cogwheel 5. Rotor 2 has been provided with blades 7 for the suction of a gaseous medium out of feed 8 and with jet channels 9 for the fluid forming the fluid vanes, for instance water, which is supplied through hollow shaft 3 with the aid of a feedline 10 and a pump 11. This pump has been connected to a casing 12, to which the fluid from the compressor is recycled.

By 13 is shown a rotatable wall with its shaft 14 freely rotatable around the shaft 3, said wall 13 bounding the space for the fluid vanes. At the end of shaft 14 a cogwheel 19 or the like is fixed for power recuperation. Alongside the periphery of rotatable wall 13 there are provided blades 15. In this embodiment the blades 15 are located near the periphery of the wall 13 and are radially disposed from the effective compressing section of the fluid vanes. Blades 15 over their entire fronts are interconnected by a wire mesh screen 16. This wire mesh screen is bounding lateral discharge 17 for the gaseous medium, which is discharged from the compressor via an outlet 18 to be connected to a duct or the like.

By blades 15, forming a ring of blades, the fluid is discharged to casing 12 alongside the inner periphery 20 of the space in which the fluid vanes are formed.

From the foregoing description it will be evident that there is provided a very effective, simple, relatively inexpensive and practicable fluid vanes compressor, avoiding losses of energy inherent in other fluid vanes compressors and effecting an improved separation of fluid and gaseous medium.

While in this specification there is described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and the invention may be modified and embodied in other forms without departing from its spirit or the scope of the appended claims.

I claim:

1. A centrifugal fluid vanes compressor for compressing a gaseous medium, comprising a driven rotor having jet channels to which fluid is supplied means for rotating said rotor, a pair of spaced parallel walls disposed near said jet channels perpendicularly with respect to the rotational axis of said rotor, said jet channels upon rotation of said rotor, forming liquid vanes effecting a compressive action upon the gaseous medium between said parallel walls, one of said parallel walls being arranged to rotate freely and concentrically with said rotor with one of its planar surfaces facing toward said rotor being provided with a ring of blades mounted perpendicularly to and near the periphery of said planar surface, said blades being interconnected by a wire mesh screen over their entire fronts which face toward said rotor, said screen bounding the discharge of said gaseous medium.

2. A centrifugal fluid vanes compressor according to claim 1 wherein said blades are radially disposed from the effective compressing action of said liquid vanes.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,612,723 Dated October 12, 1971

Inventor(s) Pieter Van Staveren

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Change the named Assignee as printed thereon to read:

--Nederlandse Organisatie voor Toegepast-

Natuurwetenschappelijk Onderzoek ten Behoeve

van Nijverheid Handel en Verkeer--

Column 1, line 61, change "gave" to --give--

Signed and sealed this 6th day of June 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

ORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334