

J. HINSCH.  
ROTARY PUMP OR BLOWER.

APPLICATION FILED APR. 26, 1915. RENEWED OCT. 16, 1918.

1,304,046.

Patented May 20, 1919.

2 SHEETS—SHEET 1.

Fig. 1

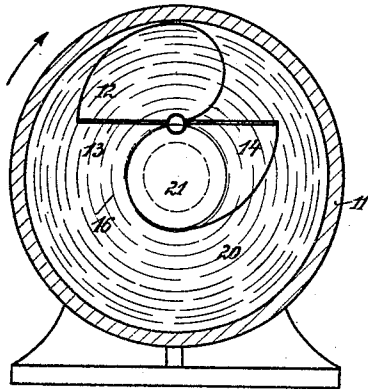


Fig. 2

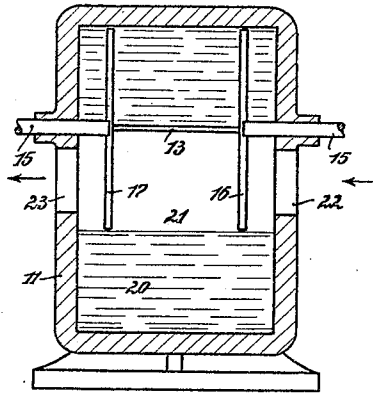


Fig. 3

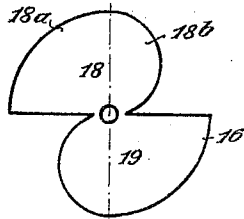


Fig. 6

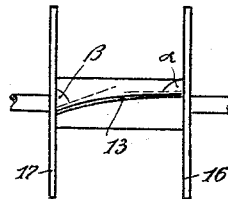


Fig. 4

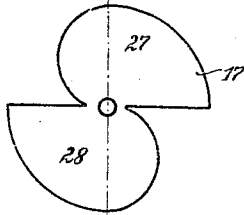


Fig. 7

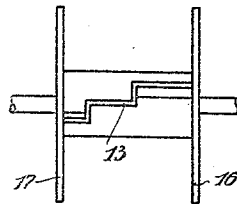
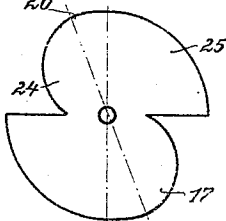


Fig. 5



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ROTARY PUMP OR BLOWER.

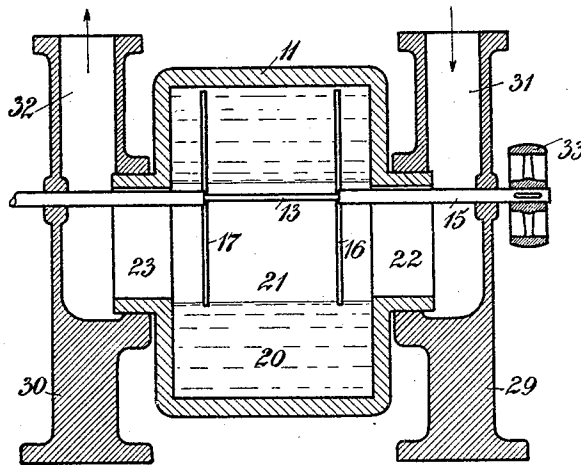
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2 SHEETS—SHEET 2.

*Fig. 8*



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# UNITED STATES PATENT OFFICE.

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## ROTARY PUMP OR BLOWER.

1,304,046.

Specification of Letters Patent.

Patented May 20, 1919.

Application filed April 26, 1915, Serial No. 23,904. Renewed October 16, 1918. Serial No. 258,392.

*To all whom it may concern:*

Be it known that I, JOHANNES HINSCH, a subject of the King of Denmark, and resident of Spandau, near Berlin, Germany, have invented certain new and useful Improvements in Rotary Pumps or Blowers, of which the following is a specification.

This invention relates to a rotary pump or blower and more particularly to a device of this class which consists of a casing having an eccentrically mounted blade wheel and which operates by means of a liquid packing ring which is maintained during rotation of the blade wheel.

The object of my present invention is to devise a pump or blower of the class specified which shall be especially constructed for conveying air or gas containing foreign bodies, such as dust particles, sand or the like. More particularly the construction is such that these bodies may pass through the pump or blower without doing any damage to the same.

In brief my invention consists in providing lateral walls on the blade wheel perpendicularly to the axis thereof, said walls being of such a form, that they will seal the medium to be conveyed at certain intervals against flow toward the outside and then open the outlet of the pump for discharging said medium to the outside.

I have shown a construction according to my present invention in the accompanying drawings, of which Figure 1 shows a transverse vertical section of the pump or blower, Fig. 2 a longitudinal vertical section of said pump or blower, Fig. 3 a form of the lateral wall adjacent the inlet of said pump or blower, Fig. 4 the form of the lateral wall adjacent the outlet, Fig. 5 a slightly modified form of the lateral walls shown in Figs. 3 and 4, Fig. 6 a plan view of the blade wheel provided with oblique blades and Fig. 7 a modification of the form of the blade shown in Fig. 6. Fig. 8 is a vertical section through a pump in which the housing is rotated by frictional contact with the blade.

Referring now more particularly to the drawings, 11 represents the casing of the pump and 12 the blade wheel which is eccentrically mounted therein. A two-bladed wheel is illustrated in the construction shown in the drawings, two blades 13 and 14 being employed which are rigidly mount-

ed upon the shaft 15 of the pump or blower. The casing in axial direction is so dimensioned that the end walls will be at some distance from the lateral walls of the blade wheel, so that an intermediate space will be provided between the end walls of the casing and said lateral walls of the blade wheel.

In Figs. 3 and 4 the lateral walls 16 and 17 for the blade wheel are shown, the former showing the lateral wall adjacent the inlet, the latter the lateral wall adjacent the outlet of the pump or blower. As will be seen from Figs. 3 and 4 the form of these lateral walls for the blade wheel is such that one will be the exact counterpart of the other. Each wall consists of two equal halves which are displaced 180° relatively to each other. In Fig. 3 these halves are designated by the characters 18 and 19 respectively. The part 18 of the lateral wall is composed of a surface 18<sup>a</sup> which is a quadrant having a radius equal to that of the height of the blade and another part 18<sup>b</sup> which has a semi-circular surface having a radius equal to one half of the height of the blade. The effective space 21 of the pump or blower is surrounded by the liquid ring. At a given moment the effective space 21 will be sealed by only one of the two halves 18 or 19 of the lateral walls, while the remaining half will be completely immersed in the liquid ring 20. If at this moment the effective space 21 is for instance entirely sealed by the half 19 of the lateral wall 16, the lower half 28 of the lateral wall 17 will also entirely seal said space 21 on the other side, while the half 27 will be completely immersed in the liquid ring.

In every other position the blades 13, 14 will divide the effective space 21 into two parts one of which communicates with the opening 22 and the other with the opening 23, that is with the inlet or outlet on the pump casing 11.

The mode of operation of my present pump or blower is as follows: If the blade wheel is rotated in the direction of the arrow at first the lateral wall 17 will open the effective space 21, while the lateral wall 16 still closes the same. During this rotation the blade 14 enters into the effective space, thereby pushing forward the medium to be conveyed which is contained in said space. As the effective space at the opening 22 in

the side wall of the pump casing is opened behind the blade 14 and the opening 23 is opened by the lateral wall 17 in front of the blade 14, the medium to be conveyed will discharge from the effective space 21 through the opening or outlet 23. At the same time behind the blade 14 in the effective space 21 a suction will prevail so that said medium will be sucked through the opening or inlet 22 into the effective space. This simultaneous emptying and filling of the effective space is carried on until the blade 14 after one half of a revolution has come into the position of the blade 13 in Fig. 1, when the cycle repeats itself during further rotation by action of the blade 13. The action of this arrangement is independent of the distance between the lateral walls on the blade wheel and the side walls of the pump casing. It is also possible to use only one blade instead of the two blades 13 and 14, as shown in the drawing or also more than two blades may be used. The lateral walls for the blade wheel must then be appropriately constructed.

The aforescribed pump or blower serves for the purpose of moving the medium to be conveyed, and if also the latter is to be compressed, according to my invention the surfaces of the lateral walls of the blade wheel can be so dimensioned that the effective space will be entirely closed from the outside during a certain part of the rotation of the blade wheel. Fig. 5 shows a lateral wall for the blade wheel which is constructed for this purpose. Between the semicircular part 24 and the quadrant 25 of the half of the lateral wall of the blade wheel there is a further sector 26 inserted, as shown in Fig. 5. By this increase of the surface of the lateral wall of the blade wheel the effect is attained that the lateral wall 17 will not open the effective space 21 while it is still closed by the other wall 16.

A compression of the conveyed medium may also be effected by retaining the lateral walls for the blade wheel shown in Figs. 3 and 4 and by making the blades 13, 14 curved as indicated in Fig. 6. In this case the angle  $\alpha$  which is formed by the advancing surface of the blade and the lateral wall 16 is larger than the angle  $\beta$  which is formed between the advancing surface of the blade and the lateral wall 17. The lateral walls 16 and 17 then will not be in the relative position, shown in Figs. 3 and 4, wherein the straight edges of the lateral walls coincide, but said walls will then be displaced relatively to each other by a correspondingly larger angle.

Instead of the curvilinear blade, as shown in Fig. 6 a blade may be used constructed according to Fig. 7. Here the surface of the blade is not disposed in a single plane, as shown in Figs. 1 and 2, but in several planes which are parallel to the shaft of the pump

or blower. The length of the several steps increases from the suction side (16) toward the pressure side (17).

A similar effect may be attained by blades which are increased toward the axis of rotation of the blade wheel or which are of a twisted construction.

The rotating lateral walls of the blade wheel according to my invention can also be employed if the casing itself is made to rotate in a known manner. The blade wheel then must be carried in bearings independently of the casing and the latter may be set in rotation from the blade wheel by means of friction or it may be rotated independently from the latter by an especial driving mechanism.

In Fig. 8 a pump is shown in which the housing is driven by frictional contact of the blade wheel therewith. The housing 11 is journaled in the supports 29 and 30. These supports contain at the same time the intake and discharge conduits for the air or the like. The air for example enters through the conduit 31, passes through the port 22 and the interior of the housing 11 and from there it is driven through the opening 23 to the discharge conduit 32. The blade wheel is eccentrically mounted with respect to the housing and rotatable independently thereof although journaled in the same supports 29 and 30. When the shaft 15 of the blade wheel is driven by the belt pulley 33, the housing is also set in rotation because it is carried along by contact of the revolving fluid ring 20.

Having thus described my invention I claim as new and desire to secure by Letters Patent of the United States:—

1. A rotary pump or blower of the class specified, comprising a casing with an inlet and an outlet, a blade wheel mounted eccentrically therein, and lateral walls for the blades of said blade wheel, said lateral walls having a form to effect proper closing and opening of said inlet and said outlet, said blade wheel with said lateral walls being of such width that an intermediate space will be left between said lateral walls and said inlet and said outlet.

2. A rotary pump or blower of the class specified, comprising a casing with an inlet and an outlet, a blade wheel eccentrically mounted therein, and lateral walls on the blades of said wheel, said blade wheel with said lateral walls having a smaller axial width than said casing, so that an intermediate space will be left between said walls and the inlet and outlet, a number of recesses provided on each of said lateral walls, said recesses on said one wall being displaced against those of said other wall in such a manner that during rotation the effective space will alternately be closed on the one side by a part of the one of said lat-

eral walls while communicating on the other side through a recess on said other wall with said inlet or said outlet.

3. A rotary pump or blower of the class  
5 specified, comprising a casing with an inlet and an outlet, a bladed runner mounted eccentrically therein, said runner having lateral walls, the axial width of said runner with said walls being smaller than the width  
10 of the casing, recesses on said lateral walls whereby said one wall will completely close up the effective space of said pump or blower on the suction side, while the other  
15 of said walls has not yet opened said effective space toward the pressure side, in order to cause a compression of the medium conveyed by said pump or blower.

4. A rotary pump or blower of the class

specified, comprising a casing with an inlet and an outlet, a runner mounted eccentrically therein and having blades which are  
20 oblique to the axis of said runner, lateral walls mounted on the blades of said runner, said walls being of a form to properly effect  
25 closing and opening of said inlet and said outlet, said runner with said lateral walls being of such width that an intermediate space will be left between either lateral wall and the appertaining inlet and outlet.

In testimony whereof I have hereunto set  
30 my signature in the presence of two subscribing witnesses.

JOHANNES HINSCH.

Witnesses:

WOLDEMAR HAUPT,  
HENRY HASPER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
Washington, D. C."