T. SHEPHERD &. J. S. HAYES.

ROTARY BLOWER, ROTARY PUMP, AND THE LIKE.

APPLICATION FILED OCT. 14, 1913.

1,158,733.

Patented Nov. 2, 1915.

4 SHEETS—SHEET 1.

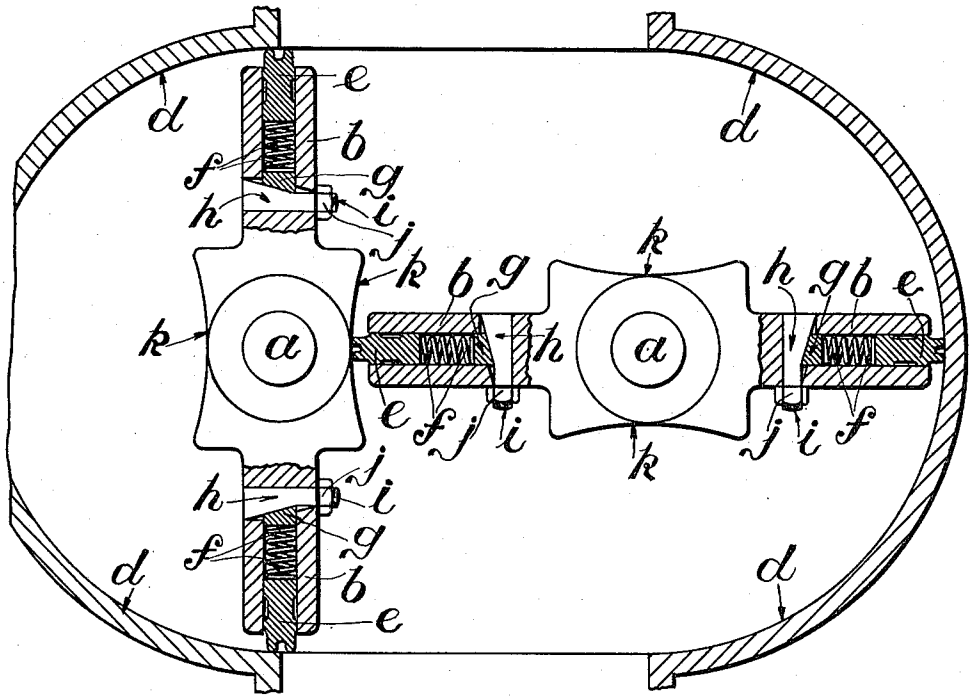


Fig. 1.

Witnesses.

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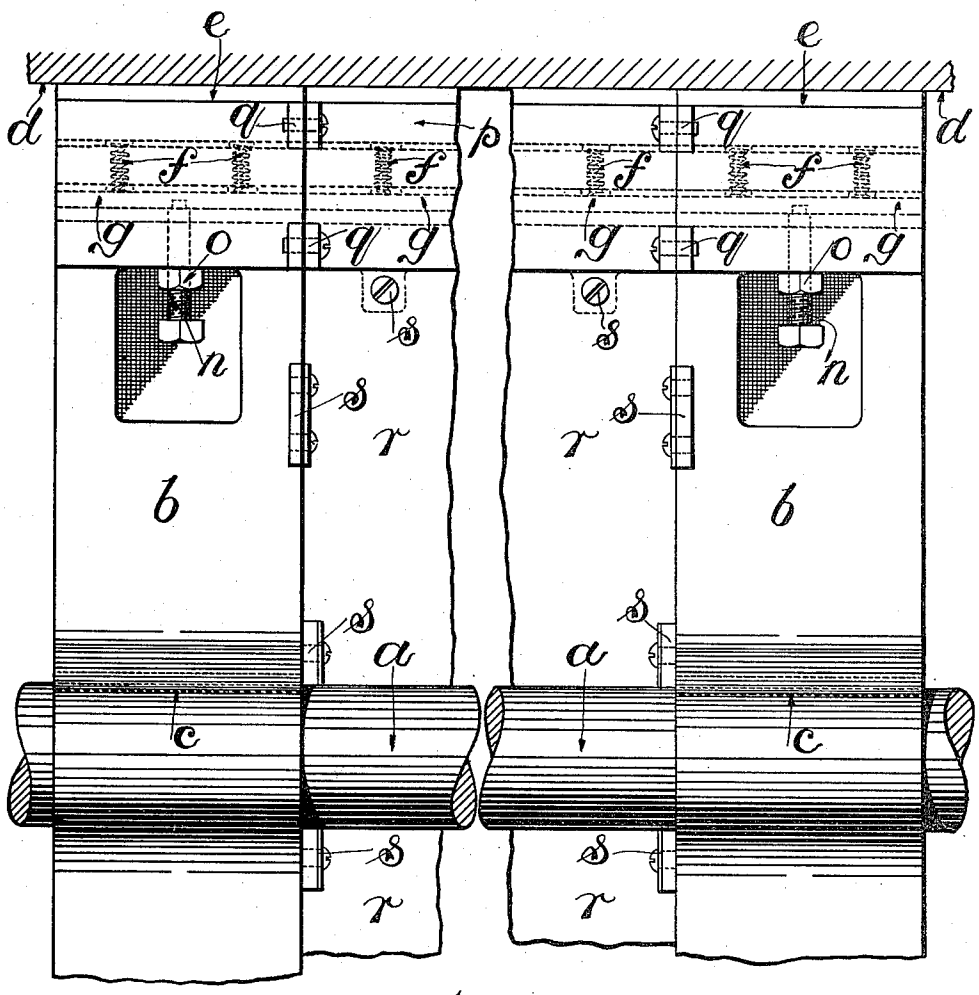


Fig. 2.

Witnesses.

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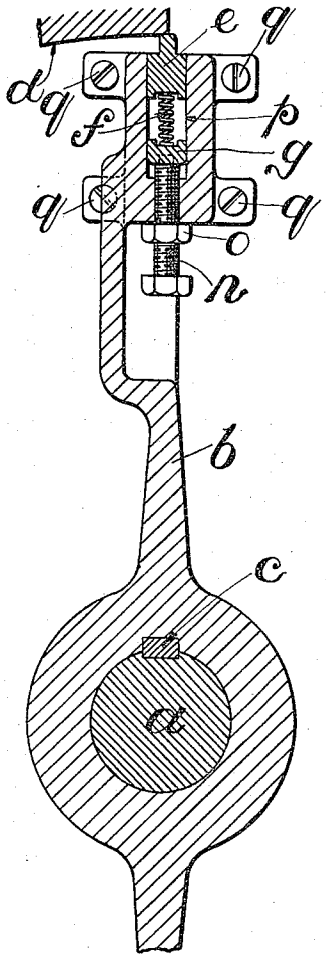


Fig. 3.

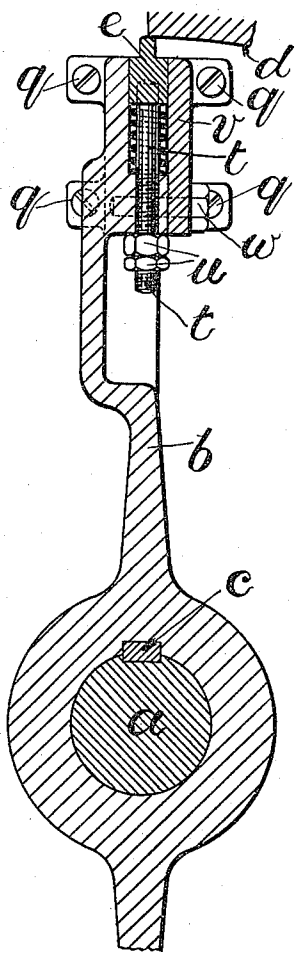


Fig. 4.

Witnesses.

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4 SHEETS—SHEET 4.

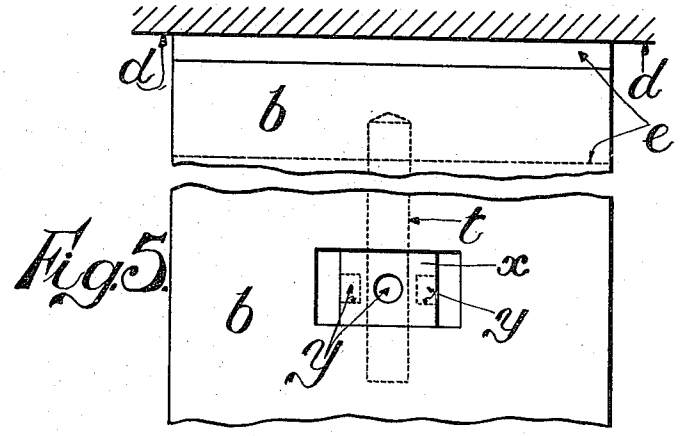


Fig. 5.

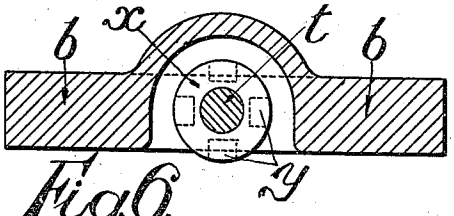


Fig. 6.

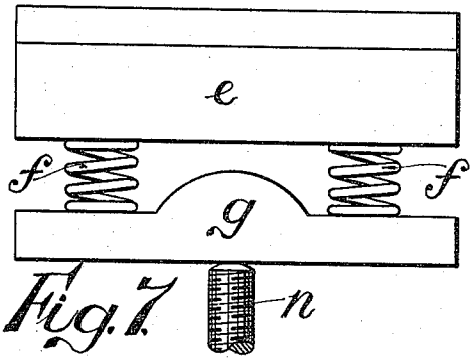


Fig. 7.



Fig. 8.

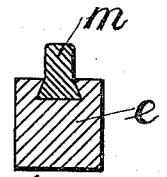


Fig. 9.

Witnesses.

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UNITED STATES PATENT OFFICE.

THOMAS SHEPHERD AND JOSEPH STANLEY HAYES, OF MANCHESTER, ENGLAND.

ROTARY BLOWER, ROTARY PUMP, AND THE LIKE.

1,158,733. Specification of Letters Patent. Patented Nov. 2, 1915.

Application filed October 14, 1913. Serial No. 795,163.

To all whom it may concern:

Be it known that we, THOMAS SHEPHERD and JOSEPH STANLEY HAYES, subjects of the King of Great Britain and Ireland, and residents of Chorlton-on-Medlock, Manchester, and Moss Side, Manchester, respectively, in the county of Lancaster, England, have invented certain new and useful Improvements in Rotary Blowers, Rotary Pumps, and the like, of which the following is a specification.

Our invention relates to improvements in rotary blowers of the Root's type though such improvements are likewise applicable to rotary pumps and like apparatus in which arms or vanes are adapted to rotate so as to compress and circulate air, force water or other liquids for various purposes though again the improvements are equally applicable where the vanes are forced round by the pressure of a liquid or fluid.

Our improvements in the above types of apparatus refer to the construction and arrangement of the vanes and particularly to the provision of adjusting means for keeping the extreme ends of the vanes liquid or fluid tight.

Previous to the date of our invention the vanes have either been made a dead fit as to their bearing ends with the cylinder, casing or the like in which they rotate or are rotated or have been provided with non-adjustable strips of leather or other suitable material secured thereto and bearing directly against the internal face of the cylinder or casing. Such strips soon wear out and require to be renewed and in any case do not preserve a permanently tight joint.

Our object is to arrange a fitting strip at the end of each vane which is adapted to float within the end of the vane in such a way that it can easily conform to any inequalities there may be in the internal surface of the casing or cylinder, that is to say, where the cylinder is not concentric to the axis of rotation of the vane or where the bore of the cylinder from end to end is somewhat tapered or not true.

A further feature of our invention is to cause the vane to have a resilient action for the purpose just referred to and likewise to provide means by which the fitting strips can be adjusted to bear with any desired pressure upon the internal surface of the cylinder or casing, some of such adjusting means allowing of elastic movement in both directions, that is to say, movement with substantially no limitation within a given range either toward or away from the axis of rotation while other adjusting means allow of substantially unlimited elastic movement within a given range toward the axis and a limited movement from the axis beyond a given point so that in the latter case the fitting strips can be adjusted to bear quite lightly against the internal surface of the cylinder or casing while maintaining a liquid or fluid tight joint.

Our invention will be fully described with reference to the accompanying drawings in which,

Figure 1 shows the application of our improvements to a blower of the Root's type, the view being a transverse section, Fig. 2 front elevation of arms carrying the vanes, Fig. 3 transverse section through one of the arms, Fig. 4 modified arrangement of the arms shown in Fig. 3, Figs. 5 and 6 front elevation and sectional plan respectively of one of the vane arms showing modified means for adjusting the fitting strip, Fig. 7 front elevation showing the adjustment of that portion of the fitting strip within one of the vane arms, Fig. 8 plan of an intermediate joint in the fitting strip and Fig. 9 transverse section of the fitting strip showing the application thereto of a narrow strip to form the actual fitting surface.

In the aforesaid drawings *a* indicates the central shafts upon which the vane arms *b* are firmly fixed by keys *c* or other suitable means while *d* indicates the internal surface of the blower casing or cylinder in which the vanes are rotated. In accordance with our invention and referring first to Fig. 1, each vane arm *b* is slotted from end to end so as to receive a narrow rail or fitting strip *e*, the outer edge of which bears against the internal face *d* while the side faces bear within the slot. The rail may extend in one length from end to end of the casing in which it rotates or may be divided into sections as hereinafter referred to in connection with the modifications shown in Figs. 2 and 3. The rail is adapted to move freely within the slot and its inner edge rests upon springs *f*, the inner ends of which again rest on bearing blocks *g* provided with in-

clined inner faces adapted to be engaged by slidable wedges *h* arranged transversely in the arms *b*, such wedges being adjusted so as to raise or lower the blocks by screws *i* extending from them carrying adjusting nuts *j*. It will be seen that by drawing the wedges toward the nuts the springs *f* are compressed so as to react with pressure upon the strip *e* and force its outer edge against the surface *d*. On the other hand when the wedges are moved in the opposite direction the springs are allowed to expand and release the pressure on the spring *e*. It will be seen that the arrangement provides the vanes with floating fitting strips adapted to conform to the inequalities of the cylinder and also, in the case of blowers, to conform with the curved surfaces *k* near the axis of the vanes so as to always maintain a liquid or fluid tight joint. The wedges *h* may be adjusted from the opposite side by set-screws instead of the screwed shanks previously referred to. The outer edges of the fitting strips may bear directly against the surface *d* or may be provided with narrow inserted strips *m* of brass or the like as shown in Fig. 9.

Like parts in the various views are indicated by similar reference letters.

In Figs. 2 and 3 the fitting strips *e* are adapted to float and are arranged in a similar manner to those shown in Fig. 1 but the bearing blocks *g* are adjusted by means of set-screws *n* which are locked after adjustment by lock nuts *o*. In other respects the arrangement acts in a similar way to that already described. Figs. 2 and 3 show the fitting strip *e* divided into three parts two of the parts being within the arms *b* and the third between the arms. The slotted portion *p* forms a continuation of the slotted end of the arms *b* and carries the central portion of the fitting strip. It is secured to the slotted arm portions by lugs and screws *q*. This construction is adopted where it is not desired to carry the vane arms in one piece from end to end of the cylinder and also for the sake of lightness, the space between the inner edges of the vane arms *b*, the shaft *a* and the under side of the slotted portion *p* being filled in with a sheet metal panel *r* secured to the parts referred to by set-screws, bolts or the like and lugs as indicated at *s*.

Fig. 4 indicates a further modification in which the fitting strip *e* is limited as to its movement away from the axis. With this object screws *t* are fixed in the strip *e*, project through the springs *f* and the lower part of the vane arms *b* where they are provided with adjusting and locking nuts *u*, which limit the movement of the strip *e* outwardly and allow of its adjustment with relation to the surface *d* while admitting of floating inwardly. A further feature is the provision of a loose plate or bar *v* to form one side of the slot carrying the strip *e*, such plate being fixed to the vane arms by set-screws *w*.

In Fig. 5 a modification of the arrangement shown in Fig. 4 is employed, the screws *t* being adjusted by screwed bosses *x* provided with tommy holes *y* to enable them to be turned round. Fig. 6 shows a sectional plan of the arrangement.

Fig. 8 indicates an overlapping joint secured by screws *z* for the fitting strip where the latter is made in sections as in Figs. 2 and 3.

The arrangements hereinbefore described give perfect contact with the internal surface of the cylinder or casing without undue friction and without any thumping or pounding or straining of the working parts. The arrangement also permits of a high rate of duty being maintained at slow speed while the working parts can be replaced easily and rapidly and at less expense, since only the fitting strips may require renewal. This is especially important where the apparatus is dealing with liquids such as acids or gritty liquids. In general the arrangement of the floating vanes gives a longer working life to the parts and a more satisfactory operation during working.

What we claim as our invention and desire to secure by Letters Patent is:—

1. The combination, with a casing having hemispherical end portions, and two intercurrent rotors journaled therein and provided upon opposite sides with curved surfaces similar to those of the said end portions, and having also vanes provided with radial slots in their edges; of packing strips slidable radially in the said slots and arranged to bear against the curved surfaces of the casing and rotors, and springs which press the said strips outwardly in the slots.

2. The combination, with a casing having hemispherical ends, and two intercurrent rotors journaled therein and provided upon opposite sides with curved surfaces similar to those of the casing, and having also vanes provided with radial slots in their edges; of packing strips slidable radially in the said slots and arranged to bear against the curved surfaces of the casing and rotors, bearing blocks also slidable in the slots under the said strips, springs interposed between the said bearing blocks and packing strips, and screws engaging with holes in the portions of the vanes which form the bottoms of the slots and forcing the bearing blocks outwardly in the slots.

3. The combination, with a casing having eccentric hemispherical end portions, and two intercurrent rotors journaled therein, each rotor being formed of similar sections having radial vanes provided with radial slots in their outer edges, slotted distance

bars secured between the slotted portions of the vanes, and closing plates secured to the said bars and vanes; of packing strips slidable radially in the slots of the vanes and bars and arranged to bear against the end portions of the casing, and springs which force the strips outwardly in the slots.

In testimony whereof we have hereunto set our hands in the presence of two witnesses.

THOMAS SHEPHERD.
JOSEPH STANLEY HAYES.

Witnesses:
WILLIAM W. TAYLER,
AMY EVELINE EVANS.

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