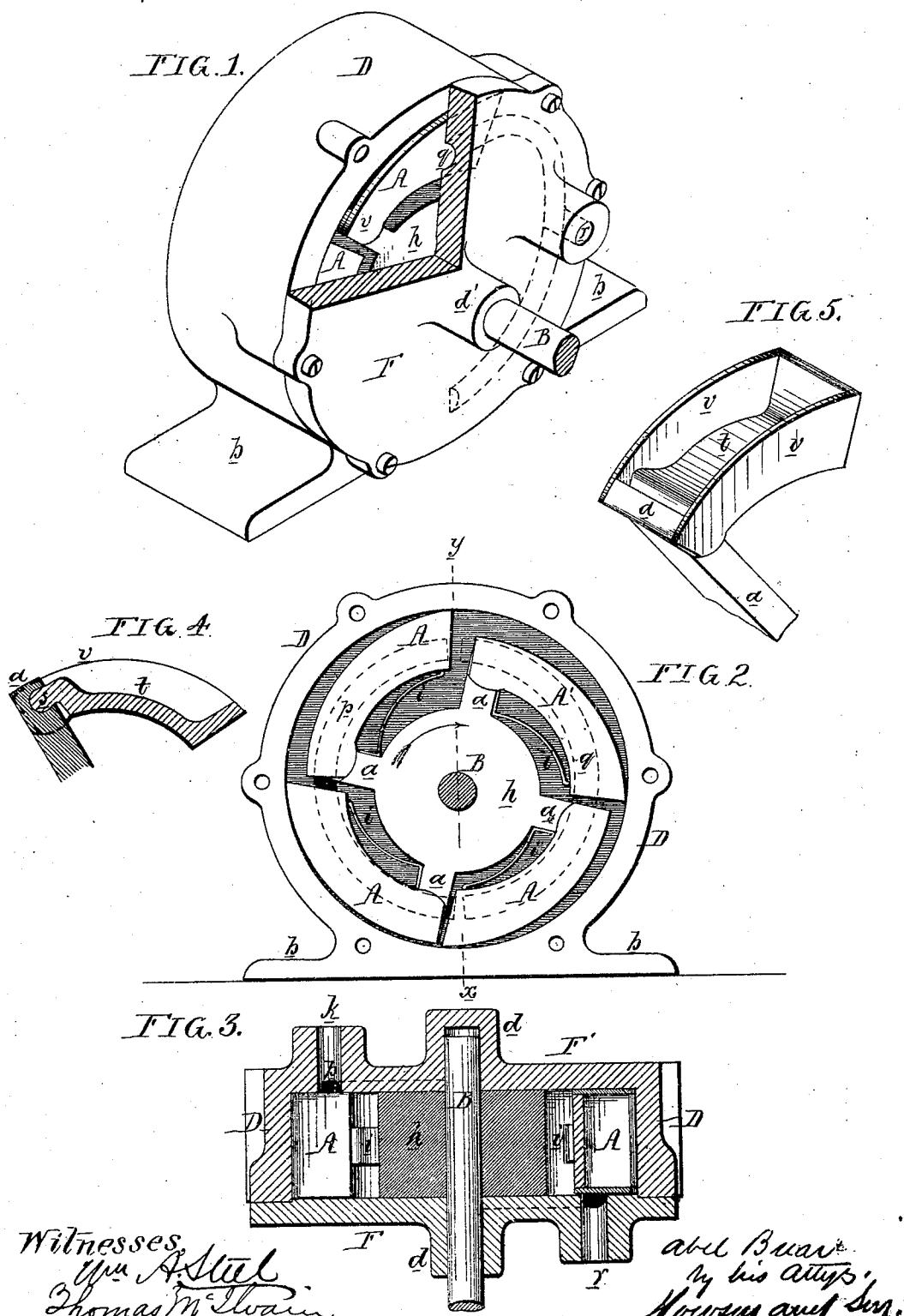


A. BREAR.

Rotary Pumps or Blowers.

No. 145,617.

Patented Dec. 16, 1873.



Witnesses
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UNITED STATES PATENT OFFICE.

ABEL BREAR, OF SAUGATUCK, CONNECTICUT, ASSIGNOR TO HIMSELF AND WILLIAM W. W. WOOD, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN ROTARY PUMPS OR BLOWERS.

Specification forming part of Letters Patent No. **145,617**, dated December 16, 1873; application filed November 15, 1873.

To all whom it may concern:

Be it known that I, ABEL BREAR, of Saugatuck, Fairfield county, State of Connecticut, have invented an Improved Rotary Pump or Blower, of which the following is a specification:

The object of my invention is to raise and force liquids, or to produce a forcible current of air, by a series of valve-like vanes, A, hinged to the arms *a* of a shaft, B, turning in the direction of the arrow, in bearings arranged eccentrically in respect to the interior of the cylinder D, within which the said vanes are contained, the movement of the latter upon their hinges, in consequence of this eccentricity, having the effect of alternately enlarging and contracting the spaces between the said vanes, and of thus admitting water or air through an opening and curved port at one side of the cylinder, and of expelling it through a corresponding curved port and opening at the opposite side, all as shown in Figure 1 of the accompanying drawing, which represents a perspective view of the apparatus, partly in section, and in Fig. 2, which represents an elevation with the head of the cylinder removed.

The casing of the pump or blower consists of a short cylinder, D, having a suitable base, *b*, and a detachable cover, F, at its front end, the plate F' at the rear end of the said cylinder being preferably cast in one piece, X, therewith, as best observed in the sectional plan, Fig. 3, on the line 1 2, Fig. 2. The interior surface of the cylinder must be turned perfectly true, and the end plate F' must also be true and parallel with the turned surface of the head F. The shaft turns in a closed bearing, *d*, in the plate F', and in a tubular bearing, *d'*, in the head F, the said bearings being arranged eccentrically in respect to the center of the cylinder, so that the shaft and parts connected therewith shall also be eccentric, the center line of the shaft being, in the present instance, beneath that of the cylinder. A hub, *h*, having four radial arms, *a*, is secured to the shaft B within the cylinder; and to the extremities of the arms are hinged four curved vanes, A, which act as valves, and the outer ends of which are maintained in contact with the curved surface of the cylinder by springs *i*. The oppo-

site faces of the hub and its arms and the sides of the vanes fit snugly against the turned ends of the cylinder, the fitting being so accurate at these points, as well as against the bore of the cylinder, as to produce air and water tight joints without creating undue friction. The hinged joints at the bases of the vanes, which will be fully described hereafter, are also of such a character as to prevent leakage between the said vanes and the arms *a*, so that the spaces between the several vanes are completely isolated from each other. Each of these spaces—that between the vanes A and A', for instance—is bounded by the inner side and front of one vane, the outer side and rear of the next vane, the hub *h* and two of its arms *a*, and a portion of the ends and curved surface of the cylinder. The inlet or exhaust opening *k* of the pump or blower is at one side of the end plate F', and communicates with a semicircular groove or port, *p*, on the inner surface of said plate, and a corresponding semicircular port, *q*, on the head F communicates with an outlet-opening, *r*, in the same. The ports *p* and *q* are arranged, in respect to each other, in the manner best observed in Fig. 2, the port *p*, as viewed in the present instance, being at the left-hand side of the cylinder, and the port *q* at the right-hand side, and the said ports are covered by the sides of the valve-like vanes A, and can only communicate with the intervening spaces through the narrow apertures between the front of one vane and the rear end of that next in advance.

The operation of the apparatus is as follows: A rapid rotary movement in the direction of the arrow, Fig. 2, is imparted to the shaft B and its vanes, when, in consequence of the eccentricity of the said shaft, the spaces between the several vanes will be alternately contracted and enlarged, the contraction being greatest at the lowest point *x*, while the greatest enlargement will be at the highest point, *y*. The gradual enlargement of the spaces between the vanes after passing the point *x* produces a partial vacuum therein, water or air consequently passing through the opening *k* and port *p*; and when each space has been filled, which occurs when the aperture between its two valves is directly opposite the point *y* of great-

est enlargement, communication is cut off with the inlet-port *p* and established with the outlet-port *q*, the gradual contraction of the filled space after passing the point *y* forcing out the water or air through the said port *q* and opening *r*. The operation being precisely the same with all of the spaces between the vanes, an uninterrupted stream of water or current of air will be forced from the apparatus as long as the shaft B is rotated.

It is immaterial, in carrying out my invention, whether four or a greater or less number of vanes are employed. The springs *i* are not absolutely essential, and may, in some instances, be dispensed with. The vanes may, if desired, be made solid, and of one piece of metal; but I prefer to construct them as shown in the sectional view, Fig. 4, and perspective view, Fig. 5, for the sake of lightness, and for convenience of hinging them to the arms *a* in such a manner as to effectually prevent leakage around the joint. The hinge is formed by adapting a circular projection, *s*, of the central portion *t* of the vane to a transverse recess of corresponding shape in the arm *a*, and the overlapping ends of the cheek-pieces *v v* of the vane are fitted snugly against the opposite re-

cessed edges of the arm, and cover the hinge, thus preventing all leakage. One or both of the cheek-pieces can be detached from the central portion of the vane, so as to permit the latter to be readily disconnected, and the several parts are milled to the proper size and shape, so as to insure accurate fitting.

I claim as my invention—

1. A rotary pump or blower in which are combined a cylinder, D, having ports *p* and *q*, communicating with inlet and outlet openings, and a series of valve-like vanes, A, hinged to the arms *a* of a shaft, B, which is arranged eccentrically in respect to the said cylinder, all substantially as specified.

2. The valve-like vane A, constructed substantially as described, with center and cheek pieces *t* and *v*, in combination with the recessed arm *a*, to which the said vane is hinged, all as and for the purpose set forth.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

ABEL BREAR.

Witnesses:

T. B. MOSHER,
SARAH T. BREAR.