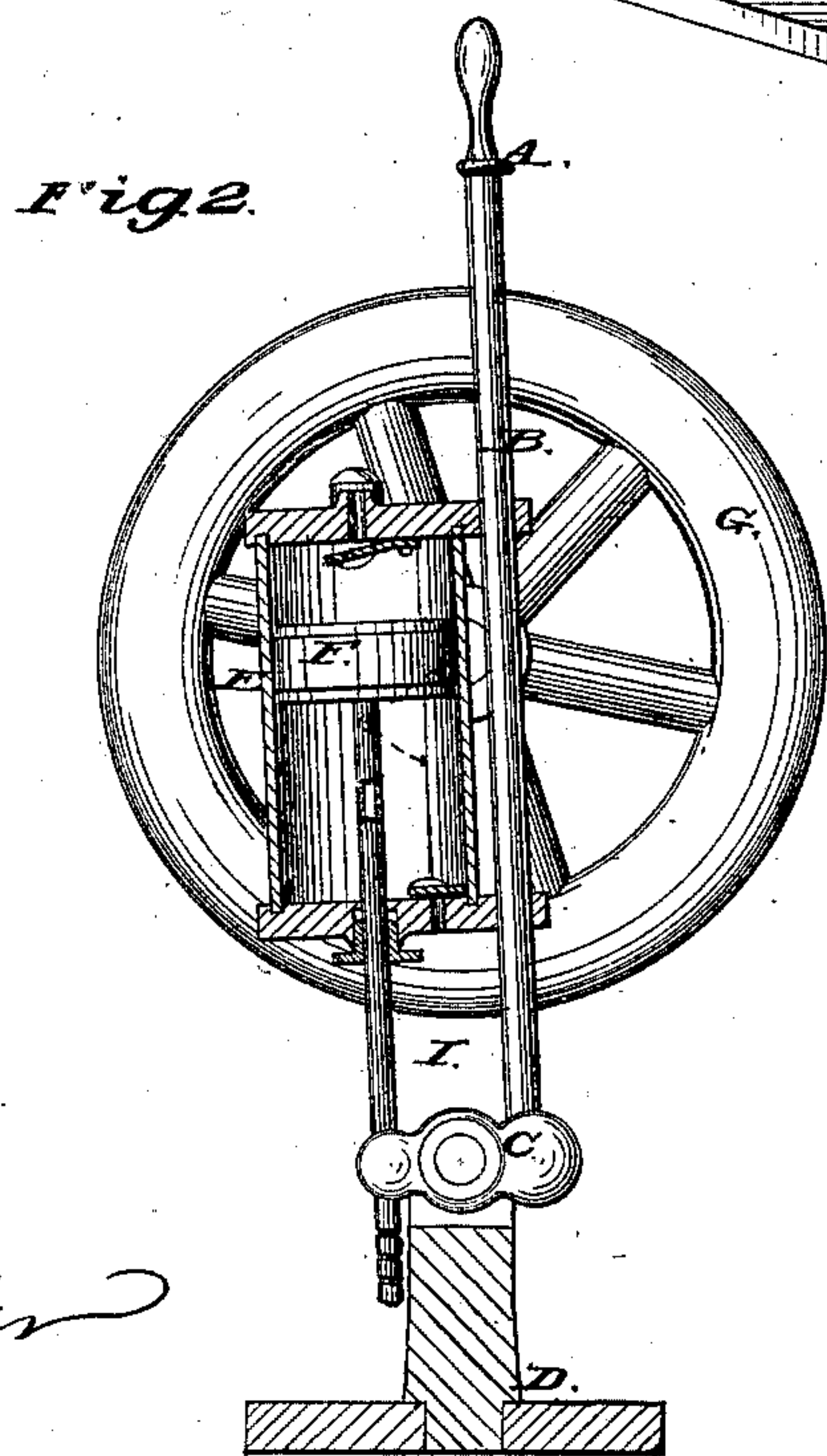
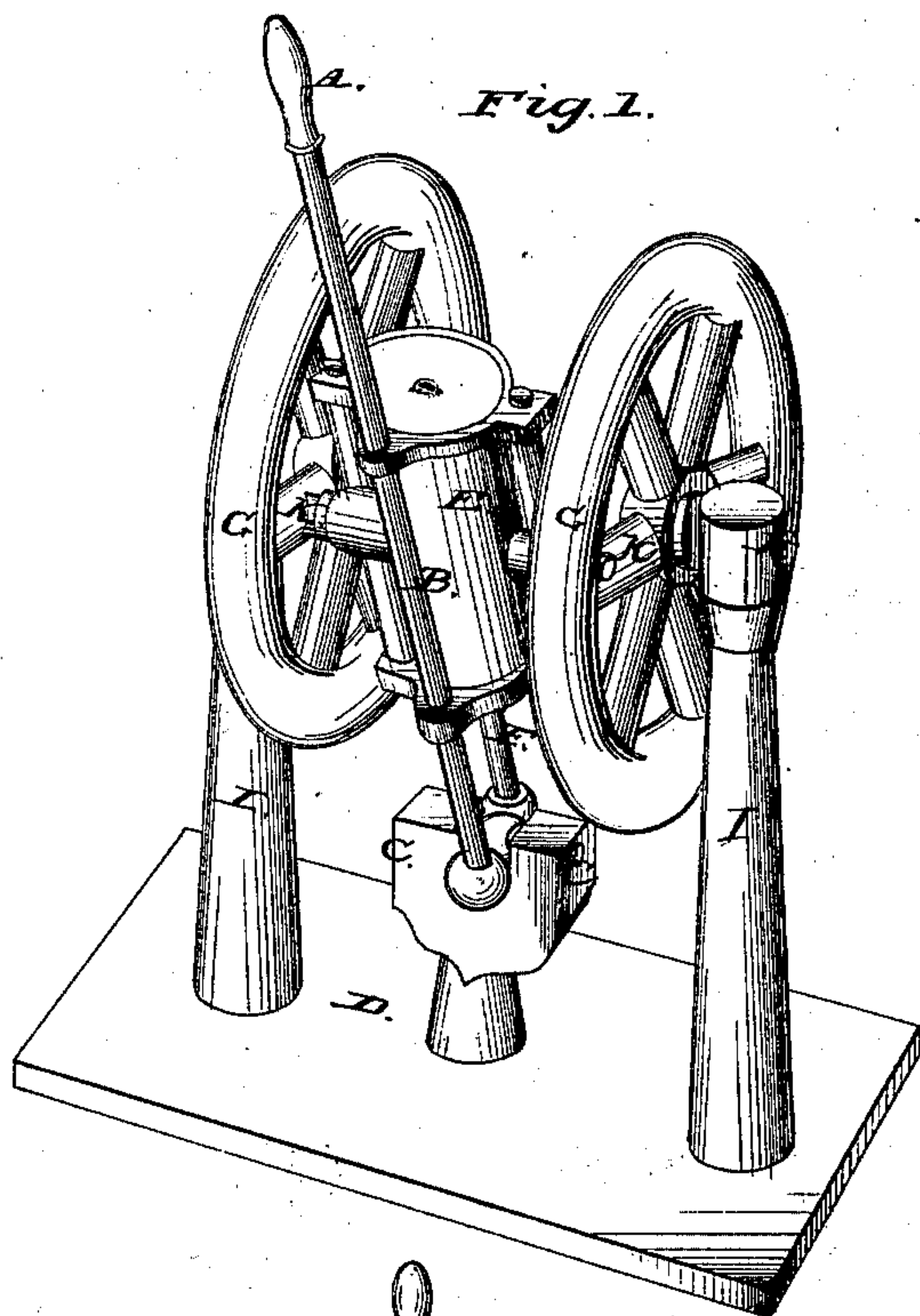


H. WEINDEL.  
Air-Pump.

No. 216,071.

Patented June 3, 1879.



Witnesses:  
*S. G. Votter*  
*G. Prof*

Inventor:  
*Hermann Windel*



# UNITED STATES PATENT OFFICE.

HERMANN WEINDEL, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN AIR-PUMPS.

Specification forming part of Letters Patent No. **216,071**, dated June 3, 1879; application filed November 19, 1878.

*To all whom it may concern:*

Be it known that I, HERMANN WEINDEL, of Philadelphia, Philadelphia county, and State of Pennsylvania, have invented a new and useful Improvement in the Mechanism of Pumps for Compressing or Rarefying Air or Gases; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, and the letters of reference marked thereon, in which the same letter represents the same part in each figure.

Figure 1 is a perspective view of the whole machine. Fig. 2 is a cut-section through the same by a plane parallel with the fly-wheels, and passing through the middle line of pump-cylinder, leaving the hand-lever with piston and piston-rod exposed, giving a side view of the same.

My invention relates more particularly to pumps worked by hand or foot power; and consists in a mechanism by which, at the first part of each stroke, when the resistance of the air is yet small, the power applied is mostly used to impart a certain speed to one or more fly-wheels, which, by their momentum, help in part to compress or exhaust the air to a certain degree, and then leave the parts in a position where a comparatively small force can overcome the great resistance encountered at the end of the stroke.

The details of my improvement are as follows: A is a hand-lever, pivoted in the frame D at C. The part B of lever A is shaped so as to serve as a guide for cylinder E, on which it can slide up and down. Firmly connected with lever A, and parallel to the guide B, formed on it, are piston and piston-rod F, which work in cylinder E. The piston-rod F is hollow, and through it the air is discharged or sucked, according to the use for which the pump is constructed, and the lower end of said piston-rod has by a piece of flexible tubing to be connected with the corresponding receiver. Cylinder E is provided with two trunnions, one on each side, K K, which engage in corresponding holes in the fly-wheels G G, so as to be suspended between the same. These fly-wheels

in their turn are supported on journals, and rotate freely on journals H H, provided on the uprights I I, forming part of frame D. The holes for the pins K K in the fly-wheels G G have both the same eccentricity.

By operating the hand-lever A the fly-wheels G G will acquire a rotary motion, and will force the cylinder E up and down on guide B, formed on this lever A. Now, supposing the cylinder E to be at the upper end of its stroke, and the wheels to rotate in the direction marked by the arrow, these wheels will have acquired a certain momentum sufficient to bring the parts in the position shown, Fig. 2, as the resistance of the air at the first part of the stroke will be comparatively small. At this point the crank-arms of fly-wheels G G will form an obtuse angle with the piston-rod F, so that the whole system will in reality form a toggle-joint, and small power applied at A will exert a great pressure in the direction of the little arrows in the cylinder to overcome the final resistance in compressing or exhausting air.

Instead of having the piston connected with lever A, and the cylinder moved up and down, the cylinder can be fastened to this lever and the piston operated upon by the wheels G G, or more than one cylinder and piston can be used, according to the purpose for which the pump is constructed.

What I claim as my invention is—

1. A lever, A, serving as a slide-rod at B for the guides of a cylinder or cylinders, E, to work up and down on, a piston-rod, and piston, which are firmly fastened on said lever in a position parallel with B, the whole device being pivoted on one end in a stout frame, and having a handle or treadle provided on its other end, where the power may be applied.

2. The combination of lever A, cylinder E, and frame D with the fly-wheels G G, substantially as described, and for the purposes set forth.

HERMANN WEINDEL,

Witnesses:

S. G. VOTTELER,  
S. RUF.