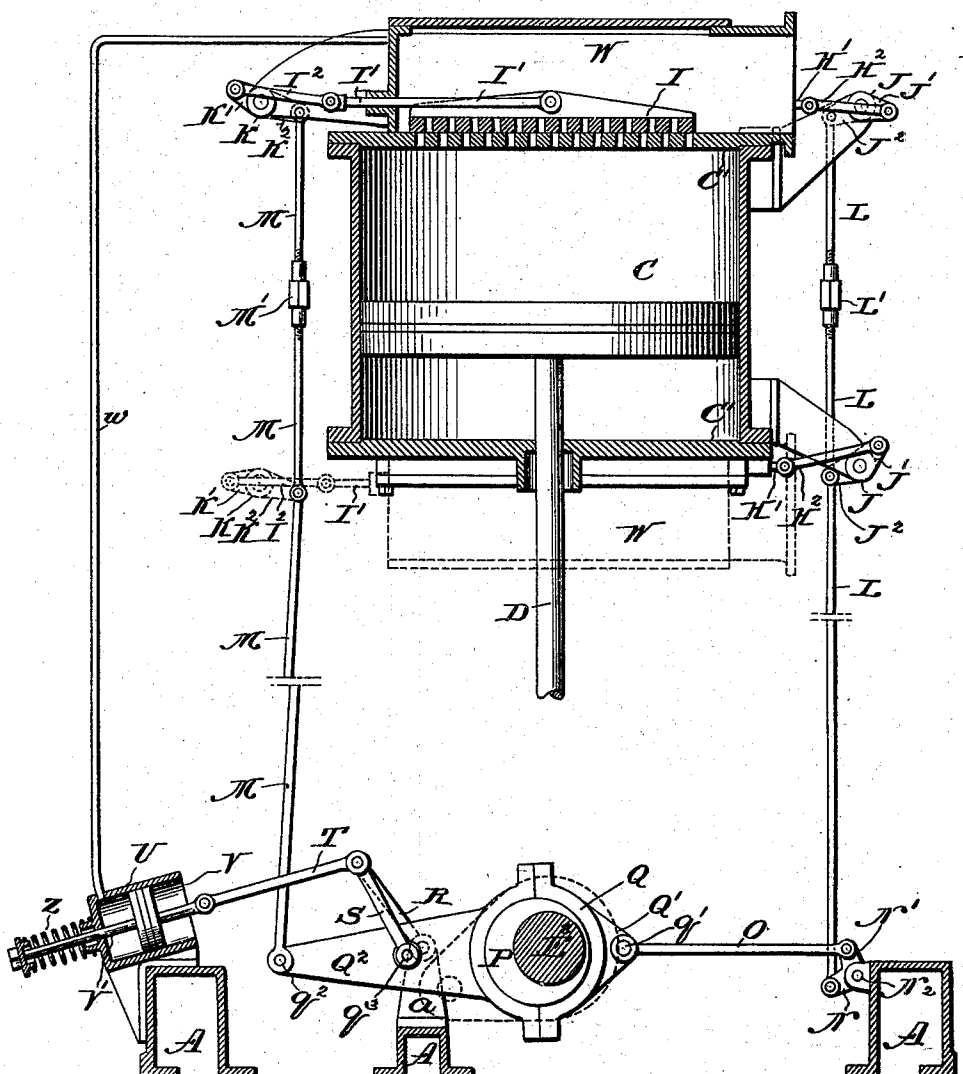


(No Model.)

W. E. GOOD & A. MARICHAL.
BLOWING ENGINE.

No. 558,944.

Patented Apr. 28, 1896.



WITNESSES:
David S. Williams,
Stewart

INVENTORS:
William C. Good
Arthur Marichal
by their attys.
Francis J. Chambers

UNITED STATES PATENT OFFICE.

WILLIAM E. GOOD AND ARTHUR MARICHAL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO THE SOUTHWARK FOUNDRY AND MACHINE COMPANY, OF SAME PLACE.

BLOWING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 558,944, dated April 28, 1896.

Application filed May 27, 1893. Serial No. 475,672. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM E. GOOD, a citizen of the United States, and ARTHUR MARICHAL, a subject of the King of Belgium, both residing in the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Blowing-Engines or Compressors, of which the following is a true and exact description, reference being had to the accompanying drawing, which forms a part of the specification.

Our invention relates to the construction of blowing-engines or compressors for air or gas, and has for its object to provide improved valve-actuating mechanism for controlling and adjusting the movements of the valves through which the air is admitted to and delivered from the tub; and our invention consists in the combination, with the tub-valves, of a positively-actuated link valve-motion and of automatic means for adjusting the said valve-motion to alter the time of opening of the delivery-valves with respect to the movement of the compressing-piston.

The nature of our improvements will be best understood as described in connection with the drawing in which they are illustrated and which represents in elevation the tub of a blowing-engine, (shown in longitudinal section,) which at the upper end passes through one of the delivery-valves, the drawing also showing the link valve-motion and automatic adjusting device, but omitting the other parts of the engine as not being necessary to a full understanding of our present invention.

C indicates the compressing cylinder or tub, the heads thereof being indicated at C' C'.

D is the piston-rod, and D' the piston working in the tub.

E² indicates the shaft of the blowing-engine; W W, branches of the receiver inclosing the delivery-valves at each end of the tub.

I indicates the delivery-valve; I', the delivery-valve spindle.

The admission-valves are not shown, but may be of any ordinary construction, H' indicating the valve-spindles to which they are attached. The spindles H' of the admission-valves are connected by links H² with the

arms J' of levers J' J², pivoted at J, and with the arms J², to which is connected the actuating-rod L. The shape of the levers J' J² and their adjustment with respect to the rod L is such as will cause the admission-valves to be acted upon alternately. The rod L is connected through a rod O and lever N N', pivoted at N², with the short arm Q' of a link Q, which will be hereinafter described. The spindles I' of the delivery-valves are connected by rods I² with the arms K' of the levers K' K², each of which is pivoted at K and connected together with actuating mechanism by means of the rod M. The rod M is connected at a point q² with a long arm Q² of the link Q, which link, it will be seen, is supported by means of an eccentric-strap upon an eccentric P, secured in turn to the shaft E². The link is supported, in addition, by means of rods S upon the upper ends of pivoted arms R, the lower ends of which arms are supported upon a standard or standards a. The point of attachment q' by which the rod O is connected with the link Q is so close to the eccentric that no material variation in the motion of the rod and the valves connected with it is effected by changing the position of the pivoted arms R; but such a change in the position of these supporting-arms materially affects the curve through which the point q² travels, to which point the rod M is attached, and by adjusting the angular position of the arms R the motion of the delivery-valves can be changed at will so as to make them open sooner or later.

To the extent above described the device shown forms the subject-matter of an individual application by William E. Good filed herewith and bearing the serial number 474,513. Our present invention consists in combining with the arms R automatic adjusting mechanism by which their angular position will be governed and changed as the pressure in the receiver W increases or diminishes. We effect this by providing a cylinder U and a piston V moving therein and connected by a rod T with the arms R. With the piston V we also connect, as by means of piston-rod V', a spring or equivalent mechanism acting constantly to draw down the

arms R toward their normal position when there is little or no pressure in the receiver. We also connect with cylinder U a pipe or conduit *w*, connected at its other end with the receiver, the pressure entering the cylinder through this conduit acting in the opposite direction to that in which the spring *z* acts, the arrangement being such that as the pressure increases in the receiver the piston V is gradually pushed outward in the cylinder V, overcoming the resistance of the spring *z* and raising the arms R, with the effect of changing the point at which the delivery-valves will open with respect to the movement of the piston D'. This point should be that at which the pressure in the tub in front of the advancing piston and the pressure in the receiver is substantially equal. Consequently as the pressure in the receiver increases the time of opening for the delivery-valve should be delayed.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

In a blowing engine or compressor the combination of the tub, a discharge-valve, a link valve-motion, means for communicating motion from said valve-motion to the valve, a cylinder as U, a piston V moving in said cylinder, and connected to mechanism for varying the motion of the valve-motion mechanism, a conduit *w* leading from the receiver of the engine to the cylinder and a constantly-acting force as spring *z* arranged to act on piston V in the opposite direction to that in which the air from the receiver moves it.

W. E. GOOD.
A. MARICHAL.

Witnesses:

JAS. H. MALONEY,
J. D. HAGENBUCH.