

No. 850,248.

PATENTED APR. 16, 1907.

G. B. PETSCHÉ.  
PUMP.

APPLICATION FILED MAY 11, 1904.

FIG. 1.

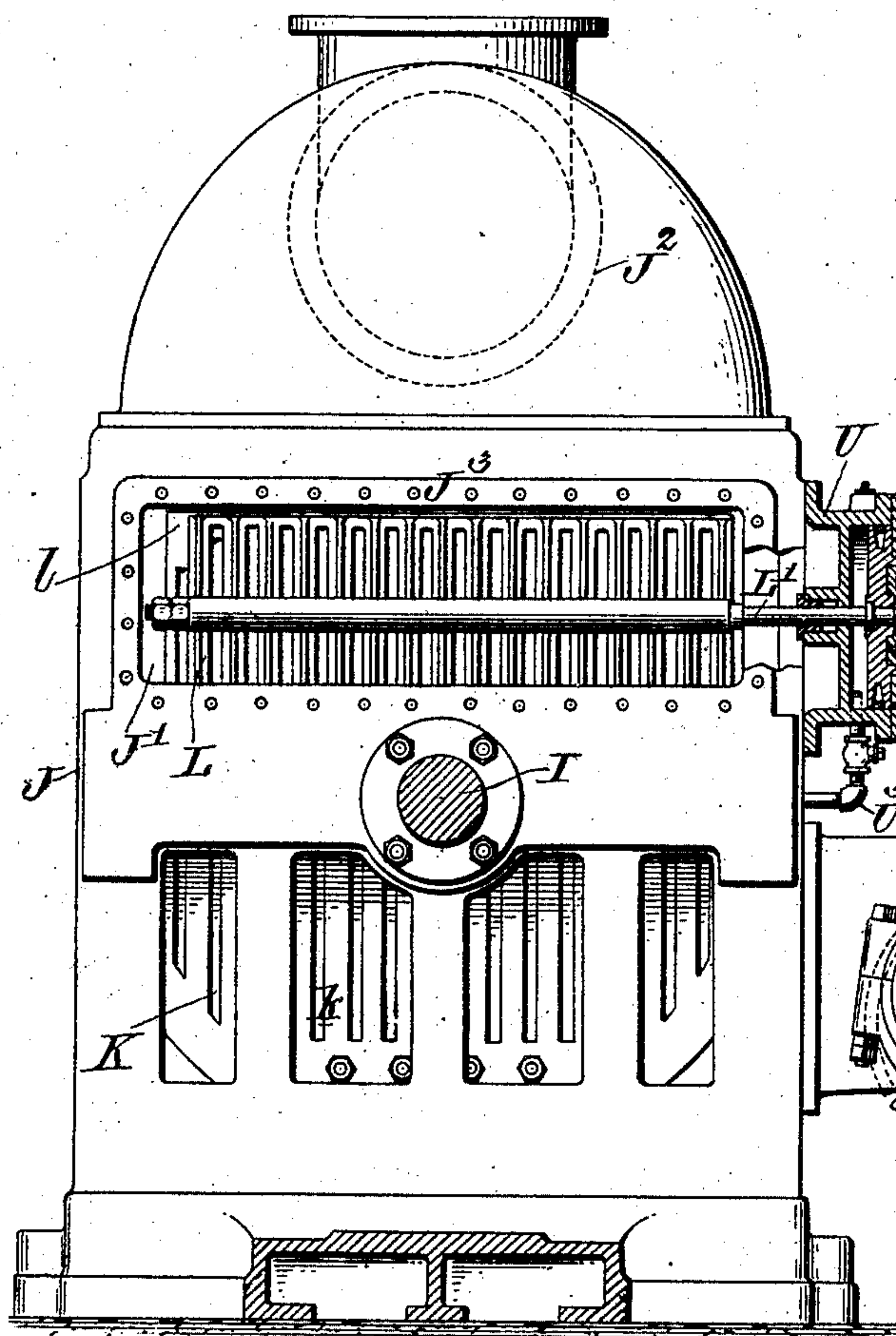
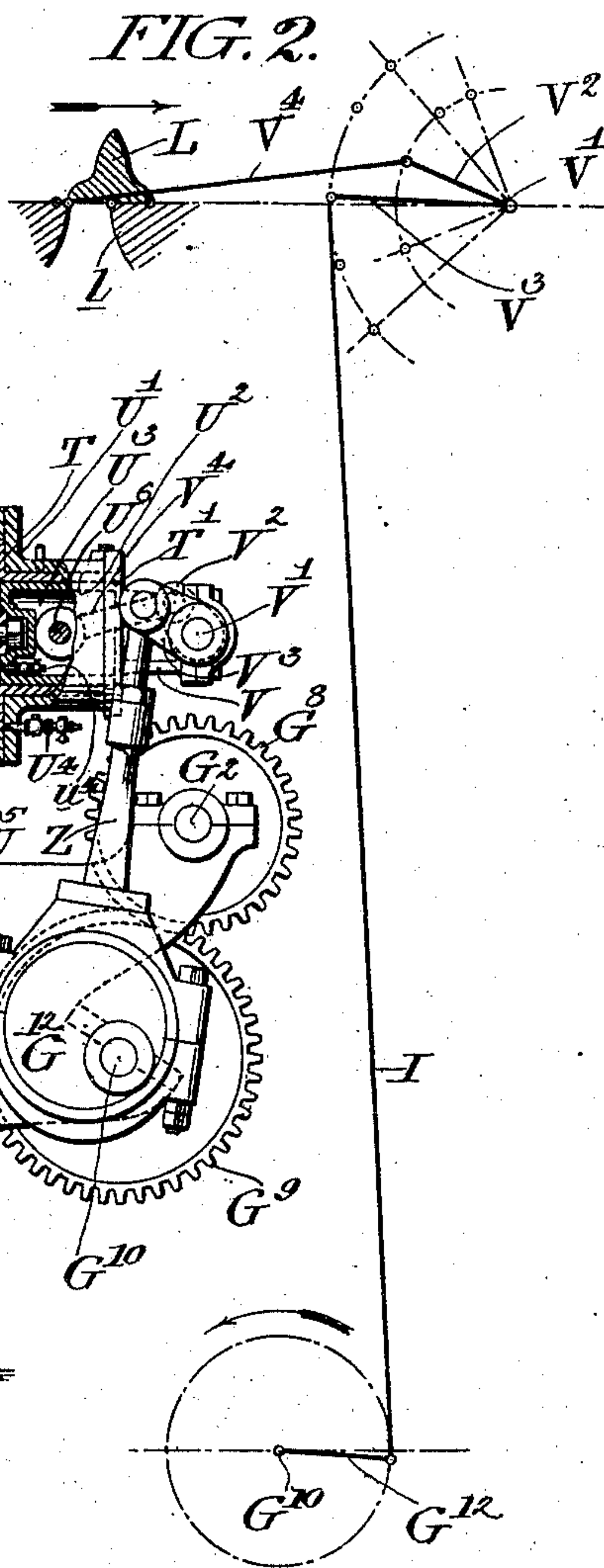


FIG. 2.



WITNESSES:

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## PUMP.

No. 850,248.

Specification of Letters Patent.

Patented April 16, 1907.

Original application filed April 22, 1903, Serial No. 153,775. Divided and this application filed May 11, 1904. Serial No. 207,379

*To all whom it may concern:*

Be it known that I, GUSTAV BERNHARD PETSCHÉ, a subject of the Emperor of Germany, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Pumps, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to a novel device for actuating the delivery-valves in pumps having sliding gridiron valves, and is especially adapted or intended for use in connection with blowing-engines or compressors.

In my Patent No. 784,122, granted March 7, 1905, on an application copending with this I have shown and described the delivery-valve-actuating mechanism which in its broad features is similar to my present invention, and in my other application for Letters Patent, filed April 22, 1903, Serial No. 153,775, of which this case is a division, I have shown and described the same mechanism, but only claim it in a particular combination with the mechanism for actuating the admission-valves.

The nature of my present improvements will be best understood as described in connection with the drawings in which they are illustrated, and in which—

Figure 1 is an end view of the compressing-cylinder of the blowing-engine with the receiver-cover removed and the actuating-cylinder which opens the delivery-valve shown in central longitudinal section, and Fig. 2 is a diagram illustrating the operation of the mechanism for closing the delivery-valve.

J indicates the compressing-cylinder of the blowing-engine, having admission-ports (indicated at *k*) and admission-valve, (indicated at *K*,) situated on the inner sides of these admission-ports.

*l* indicates the delivery-ports of the engine, and *L* the gridiron delivery-valve working on the outside of these ports, *L'* being the valve-stem.

*J'* represents the receiving-chamber of the engine, the outer cover of which, normally bolted to the flange *J*<sup>3</sup>, is removed to show the valve.

*J*<sup>2</sup> indicates a connecting-pipe connecting each end of the receivers with each other and with the common take-off pipe.

*I* indicates the piston-rod of the compressing-piston, and *G*<sup>10</sup> a constantly-rotating shaft driven by the engine through gears *G*<sup>9</sup> and *G*<sup>8</sup> and shaft *G*<sup>2</sup>.

*T* is a piston secured to the valve-stem *L'* and having projecting from its outer face the hollow cylindrical extension *T'*. The piston *T* moves in a valve-actuating cylinder (indicated at *U*) which has its front or inner end connected through a conduit *U*<sup>5</sup> with the pump-chamber *J*, as is usual in this class of blowing-engines, whereby actuating fluid is admitted to the inner end of the cylinder *U* from the corresponding end of the compression-cylinder and exhausts over back as the pressure in the compression-cylinder varies. The outer head *U'* of the valve-actuating cylinder is formed with a cylindrical extension *U*<sup>2</sup> of smaller diameter than the cylinder *U* and in which fits the hollow cylindrical extension *T'* of the piston *T*.

*U*<sup>4</sup> indicates a choke or non-return device communicating through the outer head *U'* with the interior of the cylinder *U*.

*U*<sup>3</sup> is the valve-closing slide, made, preferably, as shown, in the form of a hollow cylindrical piston fitting in the cylindrical extension *T* and carrying a pivot-pin *U*<sup>6</sup>, to which is connected one end of the link *V*<sup>4</sup>. The other end of the link *V*<sup>4</sup> is pivoted to an oscillating arm *V*<sup>2</sup>, which is secured on a rock-shaft *V'*, supported on brackets (indicated at *V*) and extending out from the edges of the cylindrical portion *U*<sup>2</sup> of the cylinder-head. The rock-shaft *V'* has also secured to it a lever-arm *V*<sup>3</sup>, to the end of which is connected one end of a link *Z*, the other end of which is secured by an eccentric-ring to an eccentric *G*<sup>12</sup>, secured to and moving with the shaft *G*<sup>10</sup>.

The operation of the above-described mechanism is easily followed. The delivery-valve is closed when the compressing-piston begins its motion toward the valve and is opened by the action of fluid under pressure admitted to the actuating-cylinder *U* from the compressing-cylinder through the conduit *V*<sup>5</sup> so long as the delivery-valve is held to its seat by pressure in the receiver of the engine materially in excess of that in the blowing-cylinder. The friction between the valve-seat and valve will prevent the latter from moving. The valve moves, however, with great rapidity when the pressures upon



its face and back become approximately equal, as the pressure in cylinder U can then promptly actuate the piston T, connected to said valve. At the close of the compressing stroke of the piston the eccentric  $G^{12}$ , through the connecting-rod Z, lever  $V^3$ , rock-shaft  $V'$ , crank-arm  $V^2$ , and connecting-rod  $V^4$ , acts upon the slide  $U^3$ , pushing it inward against the end of the piston T and moving the valve to a closed position. The connection of the connecting-rod  $V^4$  and the oscillating movement imparted to the arm  $V^2$  are such that in moving from the position indicated in full lines in the diagram Fig. 2, which position is that in which the valve is edge and edge in closing, to the position in which the arm  $V^2$  is horizontal the valve will simply move over its lap. The further downward movement of the arm  $V^2$  will in no wise affect the position of the valve, nor is it affected by the upward movement of the arm, which after passing the horizontal position retracts the closing-slide and acts simply to shift it out of the way and leave the valve free to move under the influence of its actuating-cylinder, while the succeeding downward movement will act, as before, to close the valve. The choke-conduits (indicated at  $U^4$  and  $u^4$ ) are provided for the purpose of cushioning the outward movement of the actuating-piston both with regard to the rear side of the actuating-cylinder and with regard to the closing-slide, which in a blowing-engine will not always be retracted to its full extent when the valve is opened.

In my said Patent No. 784,122, of March 7, 1905, I have described and shown mechanism for closing the delivery-valve generally similar to that hereinbefore described, except that the closing-slide is connected by means  $V^4$  with a slide reciprocating in a straight line. The particular feature of improvement in my present construction lies in utilizing the swinging arm  $V^2$  in the place of

the reciprocating slide, and with the result that I obtain in this modification or improvement a more rapid retraction and advance of the valve-closing-slide features, which in rapidly-running engines are of considerable practical importance.

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

1. In a pump, a delivery-valve in combination with intermittently-acting means acting with a yielding pressure to open said valve at a time in the motion of the compressing-piston when the pressure in the pump-cylinder and receiver are about equal, a positively-actuated oscillating shaft  $V'$ , an arm  $V^2$ , secured to said shaft, a slide, and a connecting-rod  $V^4$ , connecting said slide and the arm  $V^2$ , said slide being arranged when moved in one direction, to act on the valve to close it, and when moved in the other direction, to leave the valve free to open under the action of the intermittently-acting device aforesaid.

2. In a pump, a delivery-valve, in combination with a valve-actuating cylinder U, having a cylindrical extension from its outer head and a choke-conduit opening from its outer end, a piston T, connected with the valve and having a hollow cylindrical extension  $T'$ , fitting in the cylindrical extension from the rear head of the cylinder, a valve-closing slide  $U^3$ , fitting and moving in the extension  $T'$ , of the piston and supporting a pivot  $U^6$ , a positively-actuated oscillating arm  $V^3$ , a link  $V^4$ , connecting said arm with the pivot  $U^6$ , and means for admitting and exhausting actuating fluid to and from the inner end of the cylinder U.

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Witnesses:

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