

A. BAUMANN.

Piston-Valves for Steam-Engines.

No. 139,357.

Patented May 27, 1873.

Fig. 1.

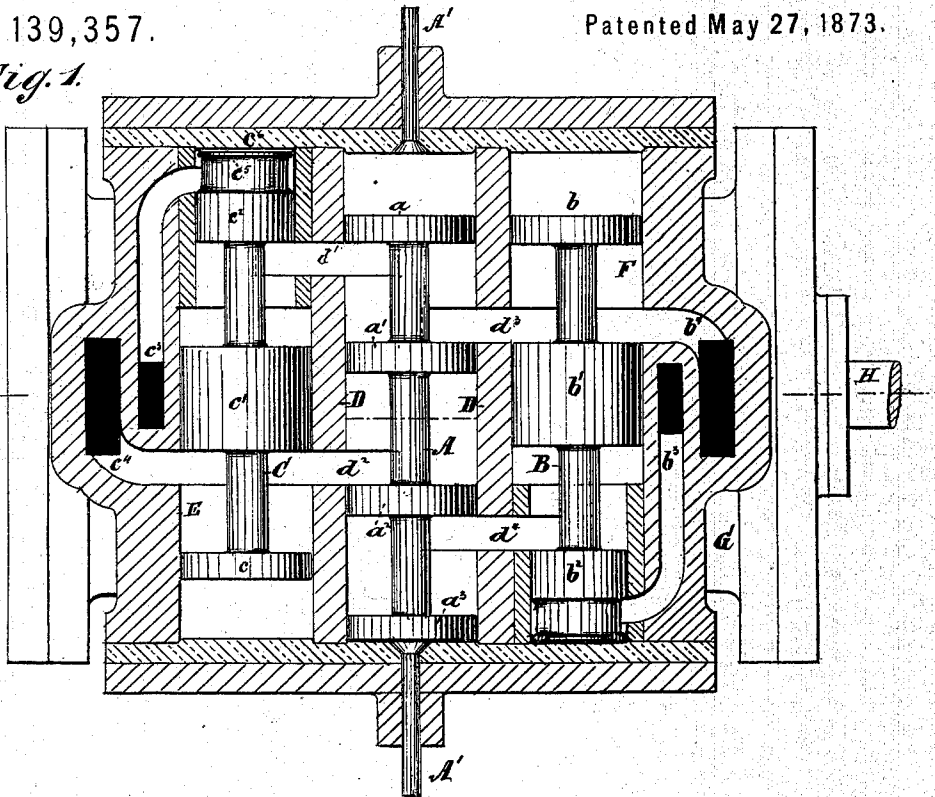
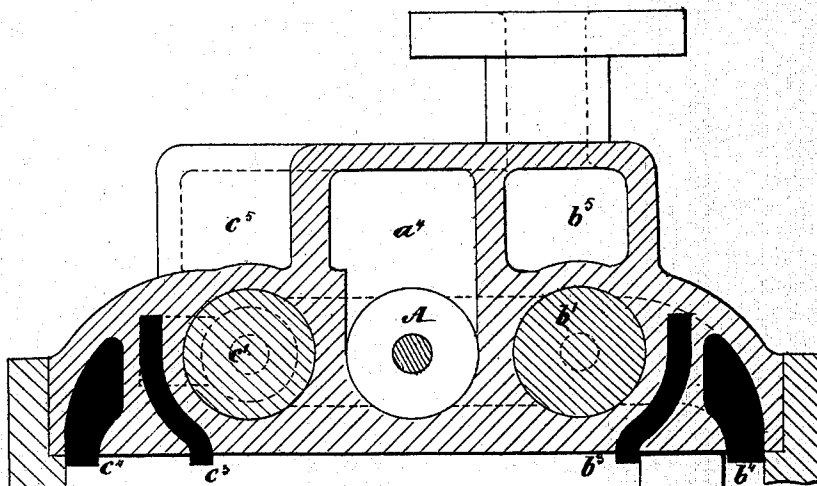


Fig. 2.



Witnesses:

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IMPROVEMENT IN PISTON-VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **139,357**, dated May 27, 1873; application filed February 14, 1873.

To all whom it may concern:

Be it known that I, ALEXANDER BAUMANN, temporarily residing in London, England, have invented a new and useful Improvement in Steam-Engine Valves, and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification.

The invention consists in cutting off the steam from the main cylinder before its piston has reached its throw, by detached leading-valves, one at each end of the main cylinder, and an intermediate one, all moved by the pressure of the steam that fills the main cylinder at or near the completion of each stroke. This piston-valves cut off the exhaust of the main cylinder before the end of each stroke, thereby forming therein a steam-cushion, which checks the momentum of the main piston, and receives it with a yielding resistance like a spring, thus making high speed much safer. It is also economical, because the steam-cushion stores up power, which is exerted in the re-action to send the piston back.

Figure 1 is a horizontal section. Fig. 2 is a vertical section.

In the drawing, A represents a central valve having four disks, $a^1 a^2 a^3$, of nearly the same diameter, and arranged on the same spindle. B C are valves, each having three disks, $b^1 b^2$ and $c^1 c^2$, each set arranged on its own spindle, but one of each set of disks less in diameter than the other two. Each of these piston-valves is made of a single piece of cast-iron, while the central one is provided with rods A' , which allow it to be moved by hand. All the cylinders D E F which surround these valves communicate with each other by passages $d^1 d^2 d^3 d^4$, as shown in Fig. 1 of drawing. The central cylinder D communicates with the steam entrance-port about the middle of its length, and between the disks $a^1 a^2$, while the side-cylinders communicate with the exhaust-pipe by suitable ports $c^3 b^3$. $b^4 c^4$ are the ports which admit steam into the main cylinder G at each end. a^4 is the steam-supply, and $b^5 c^5$ the exhaust-passages

of the main cylinder G. H is the piston-rod of the piston that reciprocates in the cylinder G. c^6 is an annular groove to distribute the steam equally around the piston-valve C, and allow it to pass up behind the disk c^5 , which is made for that purpose smaller than the disks c^2 . The disks a^3 are also smaller than the disks $a^1 a^2$, to allow the passage there-around of the exhaust steam.

The operation is as follows: The pistons being placed as shown in drawing, and the live steam, being entered between the disks $a^1 a^2$, escapes through the channel d^2 across the cylinder E and through the port c^4 into one end of main cylinder F, which forces the main piston forward to the other end of cylinder; but as soon as the main piston has passed the exhaust-port c^3 the exhaust steam rushes up therethrough around the recess c^6 , and behind the disk c^5 . This has the effect of throwing down the piston C upon the steam-cushion beneath the disk c , and allowing the exhaust steam to escape between the disks $a^1 a^2$, and over the former. The air-spring then returns piston C to its place, while the central piston A is forced upward, and allowed to throw live steam through the passage d^3 into the port b^4 at the other end of main piston, which is thereby returned. It will thus be perceived that the piston passes the exhaust-ports $b^3 c^3$ before it reaches the end of its throw, and thus cuts off the further egress of the exhaust steam, and forms a cushion for itself at each end of the cylinder. The escape of steam that has filled the main cylinder is thus prevented until the position of the main valve is completely reversed, which produces great certainty and uniformity in the operation. The auxiliary pistons, as well as the main one, are stopped at the ends of their strokes by steam cushions and by a layer of rubber, protected by a thin sheet of rolled brass, that makes the operation noiseless.

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

1. The main cylinder G, provided with exhaust-ports $b^3 c^3$ arranged therein at a short

distance from each end, as described, so that the piston will cut off the exhaust-steam before reaching the end of its throw, and thereby form a cushion for itself at each end of the cylinder.

2. The automatic valve mechanism, consisting of the valves A B C constructed and ar-

ranged in cylinders D E F, connected with one another and with the main cylinder G, as and for the purpose set forth.

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Witnesses :

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