

W. D. Grimshaw,

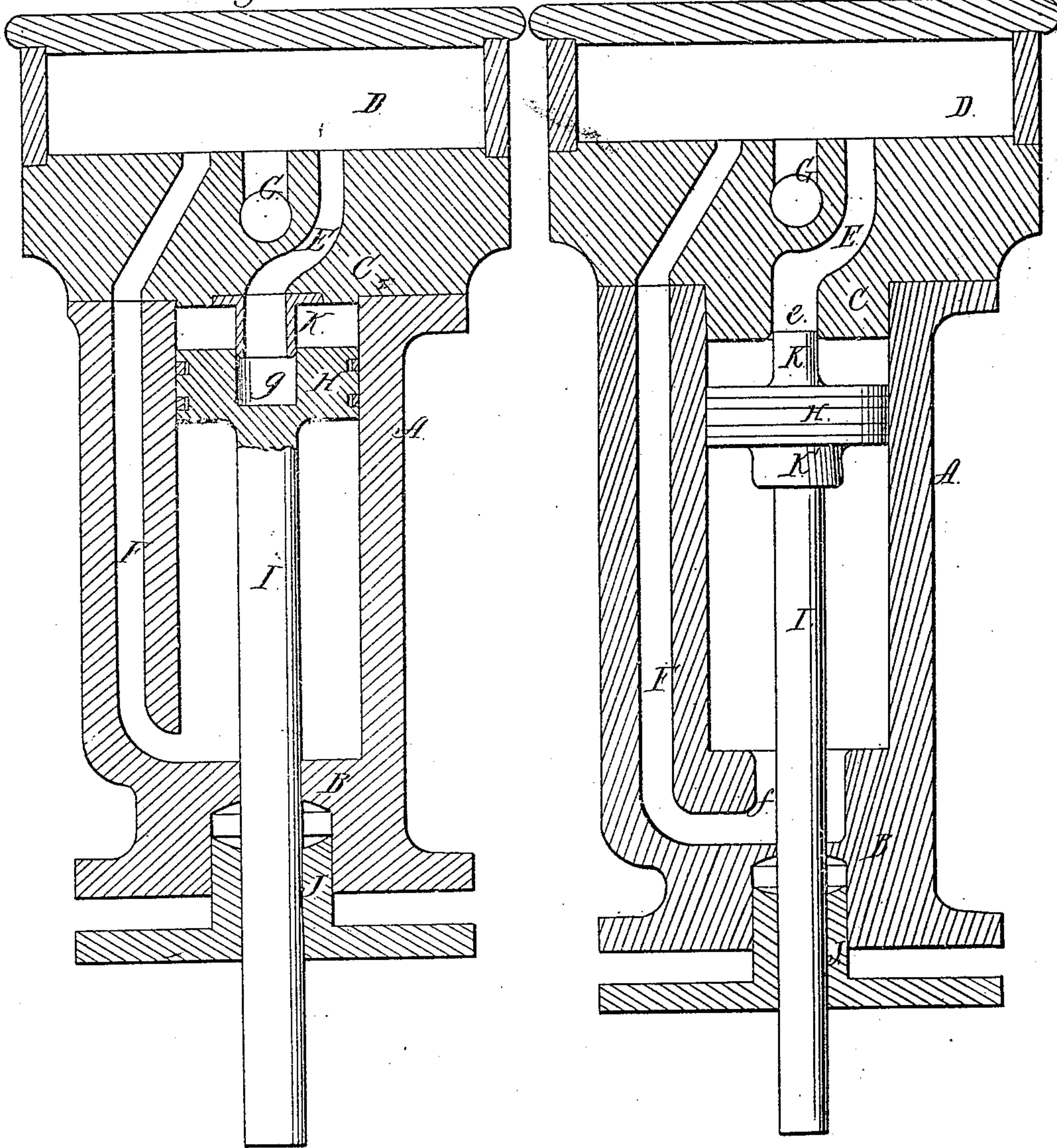
Steam-Engine Attachment,

No 64,972,

Patented May 21, 1867.

Fig. 2.

Fig. 1.



Witnesses:

M. Connelley
G. W. Reed

Inventor:

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United States Patent Office.

WILLIAM D. GRIMSHAW, OF NEWARK, NEW JERSEY.

Letters Patent No. 64,972, dated May 21, 1867.

IMPROVEMENT IN RECIPROCATING ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM DAKIN GRIMSHAW, of Newark, in the county of Essex, and State of New Jersey, have invented a certain new and useful Improvement on Cushioning Attachments to Reciprocating Pistons, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification, and in which—

Figures 1 and 2 represent vertical sections of an inverted cylinder, with a reciprocating piston working therein and other appendages pertaining to a direct-acting hammer that may be operated by compressed air or other aeriform fluid, and showing my improvement as applied under two modifications of its construction.

Like letters indicate like parts throughout both figures.

My invention has reference to cushioning devices applicable to reciprocating pistons generally, irrespective of the description of aeriform fluid employed to operate the pistons, or the particular disposition or arrangement of the latter and their cylinders, whether vertical, horizontal, or occupying an inclined position to the horizon, and is equally applicable to steam or other engines and direct-acting hammers driven by the elastic force or pressure of any aeriform fluid.

The nature of my invention consists, in connection with a suitable disposition of the parts and extension of the cylinder beyond the reciprocating stroke proper of the piston, in providing the latter, on either or both its faces, or the cylinder-head and bottom, or either, with protuberances that serve, on the piston passing the extreme limit of its stroke proper, to plug up or stop, in a free or moveable manner, the port or passage, and thereby to shut off egress and cause the fluid contained between the cylinder-cover and piston to act as a cushion to the latter, so that, on the piston passing the limit of its stroke, as described, by the breakage or disarrangement of the parts or devices that serve to limit or control the play of the piston to a fixed length of stroke, it will be restrained from bursting or breaking the cylinder-head or end, or otherwise producing damage.

Referring to the accompanying drawing, which represents my invention as it may be applied to a direct-acting hammer operating, say, under the force of compressed air, A is the inverted hammer-cylinder, B its lower head or end, and C its upper cover, having seated on it a valve-chest, D, from which E is the upper port or passage, F the lower, and G the exhaust. H is the reciprocating hammer-piston and I its rod, passing through a stuffing-box or gland, J. The cylinder A is of somewhat greater length than that of the piston's stroke when restrained within its extreme or proper limits.

In fig. 1, K K' are protuberances on the faces of the piston, so arranged as that, on the travel of the latter, by accident or breakage, beyond its proper extreme limits, they enter and closely fit or slide within, as a moveable plug, openings *ef* in the cylinder-heads, that form an extension or part of, as it were, the upper and lower ports E and F, thereby retaining within the cylinder, between the face of the piston and cylinder-head, at the end in which the plug K K fits the port E or F, a certain amount of the impelling or elastic fluid, which, in the further sliding of the piston towards the end of the cylinder so plugged, will act as a cushion to prevent breakage or injurious shock, and to produce an advantageous rebound.

In fig. 2, substantially the same cushioning-device is shown as applied to one end of the cylinder; but here the protuberance K is represented of a tubular form, and as attached to the cylinder-head or end, and forming a combination, as it were, of the port E, while the piston has a correspondingly-shaped recess, *g*, that receives within it the protuberance K, on the piston exceeding its stroke towards such end of the cylinder, and, as in the former case, forming a sliding-plug attachment, as it were, to retain the fluid in the cylinder to act as a cushion to the piston. Of course, though the cushioning device is in this figure only shown as applied to one end of the cylinder, it may be used at both ends.

By the construction and operation, as described, of this my safety-cushioning attachment, it will be seen that all breaks or openings in the cylinder, whether by ports or otherwise, causing the piston to catch or cut in the reciprocating play thereof, even if it should exceed its extreme length of stroke proper, is or may be avoided.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination with a reciprocating piston of a cushioning attachment, operating as a sliding or moveable plug to the port or ports of the cylinder, substantially as specified.

W. D. GRIMSHAW.

Witnesses:

J. W. COOMBS,

G. W. REED.