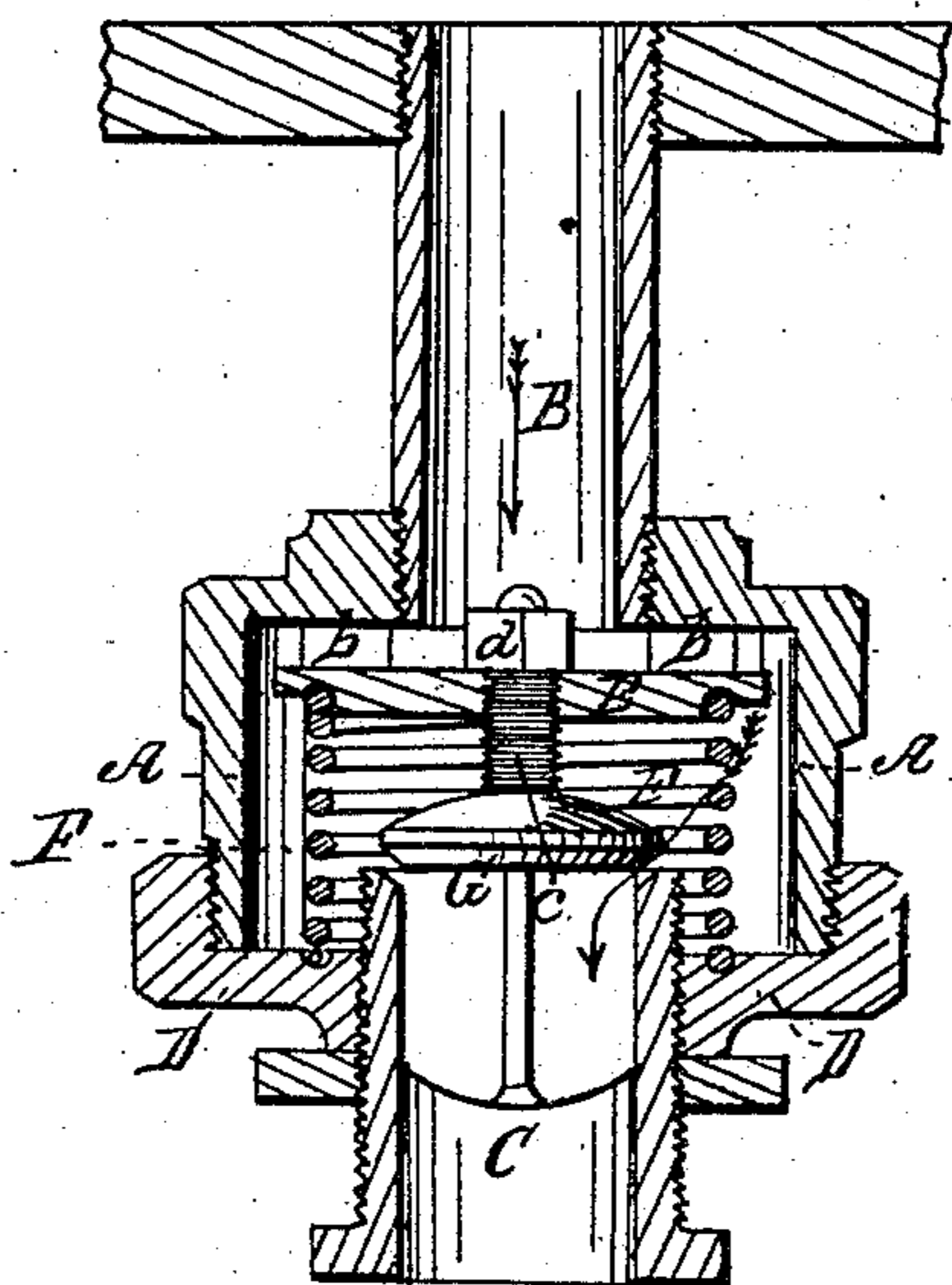
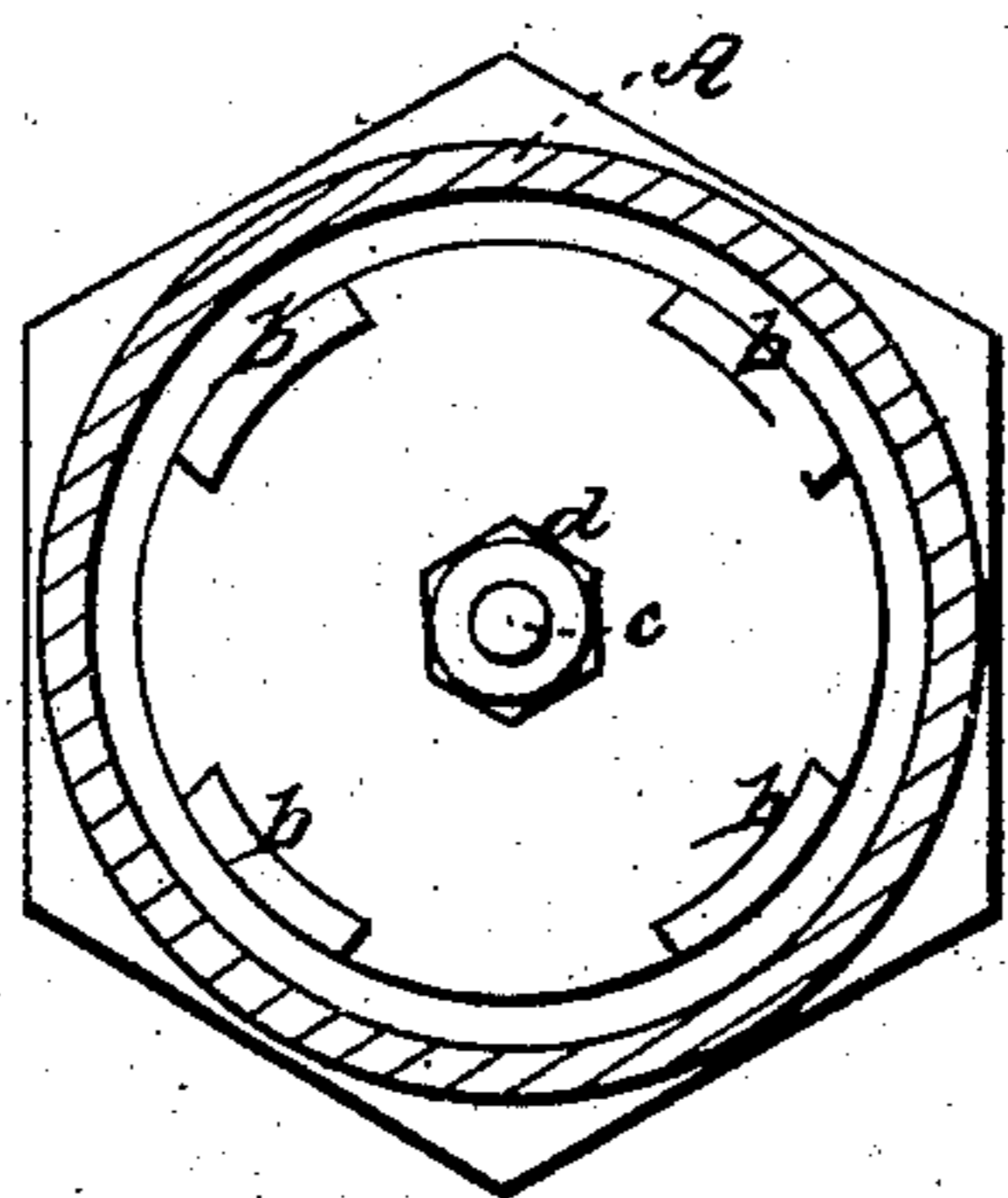


*F. Douglas,*  
*Steam Trap.*  
*No 27,704.*      *Patented Apr. 3, 1860.*

*Fig. 1*



*Fig. 2*



*Witnesses;*  
*J. W. Coombs*  
*A. S. Spencer*

*Inventor;*  
*Frank Douglas*  
*per Mumf. & Co.*  
*attys.*

# UNITED STATES PATENT OFFICE.

FRANK DOUGLAS, OF NORWICH, CONNECTICUT.

## STEAM-ENGINE.

Specification of Letters Patent No. 27,704, dated April 3, 1860.

*To all whom it may concern:*

Be it known that I, FRANK DOUGLAS, of Norwich, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Valves for Relieving the Cylinders of High-Pressure Engines of Water and Exhaust-Steam and for other Purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a central vertical section of a valve and its box, with my improvement. Fig. 2, is a horizontal section taken just below the top of the valve box.

Similar letters of reference indicate corresponding parts in both figures.

The principal objects of my invention are 1st to obtain an automatic substitute for the cylinder cocks used in locomotives and other high pressure engines, and 2nd to keep the piston of the engine free from any back pressure of steam; and to this end my invention consists in the employment in combination with a puppet valve within the same box attached to the cylinder, and with a spring for opening the said valve, of a plate applied and operating substantially as hereinafter described.

A, is the valve box attached to the bottom of the engine cylinder by a short piece of pipe B, screwed into or otherwise secured to the top of the box.

G is the valve fitted to a seat *a*, which is formed around the upper end of a tube C, which is screwed into the bottom of the box A, in such manner as to permit the said seat to be adjusted higher or lower. The said box is made with a movable bottom D, to afford convenience for inserting, taking out and grinding the valve; and the tube C, is fitted with a set nut which screws on to its exterior and up against the bottom D, of the box to enable the valve seat to be secured at any distance from the bottom of the box, at which it may be adjusted.

E is the plate, and F, is the spring which constitute my invention the said plate being much larger than the transverse area of the pipe B, and as much smaller as the horizontal sectional area of the box A, as to leave room for the escape of the water or exhaust steam between it and the sides of the box. The said plate is furnished with

two or more projections *b, b*, on its upper surface to bear against the top of the box for the purpose of permitting the escape of water or steam between it and the top of the box under all conditions; and it has the stem *c*, of the valve screwed into and through it and secured firmly to it by a set nut *d*, which screws on to the upper projecting portion of the stem.

The spring F, is represented of spiral, but may be of other construction and is applied between the bottom of the box A, and the bottom of the plate E, in such a manner as to exert a constant tendency to press the said plate against the top of the box and keep the valve open as represented in Fig. 1. One of these valves is to be applied near each end of the cylinder by screwing the tube B, of its box to a hole provided in the cylinder.

The operation is as follows: As the cylinder on each side of the piston begins to fill with live steam some of the steam passing down the tube B, strikes the plate E, and instantly depresses it far enough to close the valve, and when the valve is closed, the steam filling the box A, presses on the upper surface of the valve and keeps the latter tight, but as soon as the steam begins to exhaust and relieve the upper surface of the valve to a considerable extent of pressure the valve is opened, by the upward pressure of the spring against the plate E, and the piston relieved of back pressure. When the engine is not in operation the plate is held up with its projections *b, b*, in contact with the top of the box A, and any water of condensation allowed to run out, there being always a space between the tube B, and the plate. By screwing the tube C, up or down in the bottom of the box and the valve stem down or up through the plate E, the valve and seat can be so adjusted that though the valve will never be closed by the back pressure on the exhaust side of the piston, it will not fail to be closed by the pressure of the live steam as soon as any is admitted to the cylinder. By the use of the plate E, the valve is enabled to be closed more promptly by the pressure of the live steam and hence the loss of steam is more effectually guarded against than if the said plate were not used, and the steam had to act upon the valve itself before closing it, and besides this the said plate constitutes

a means of adjusting the valve above described.

Instead of making the projections *b, b*, in the plate E, the said plate may be made  
5 flat on its upper surface and similar projections made on the interior of the top of the valve box.

Instead of arranging the valve to work vertically the parts may be arranged to work  
10 horizontally or in any other direction.

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

The plate E, in combination with the valve G, the spring F, and the box A, the whole constructed to operate substantially 15 as herein described.

FRANK DOUGLAS.

Witnesses:

A. F. PARK,  
A. H. LESTER.