P. Shearer,

Steam Balanced Valve.

No. 37,644. Patented Feb. 10, 1863.

Fig: 2.

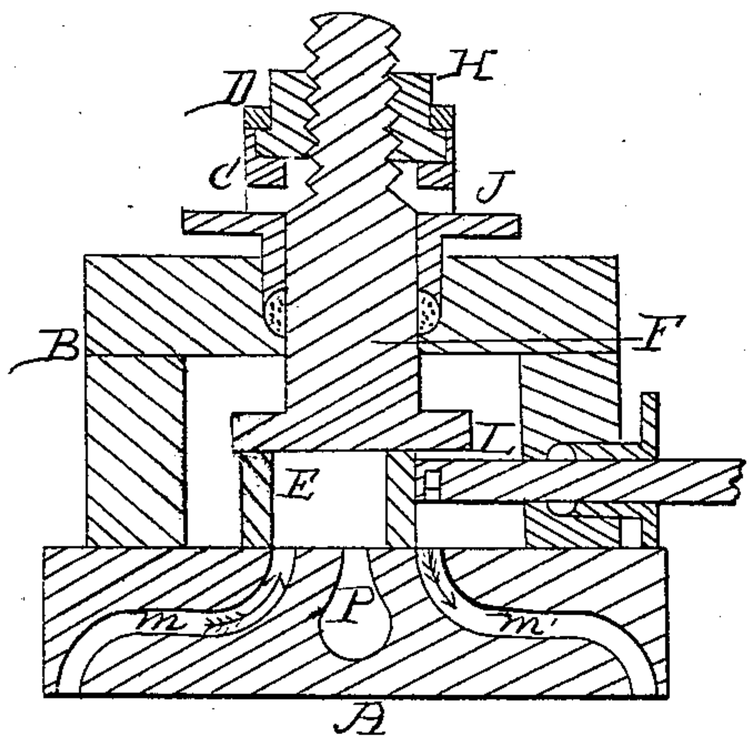

Fig: 3.

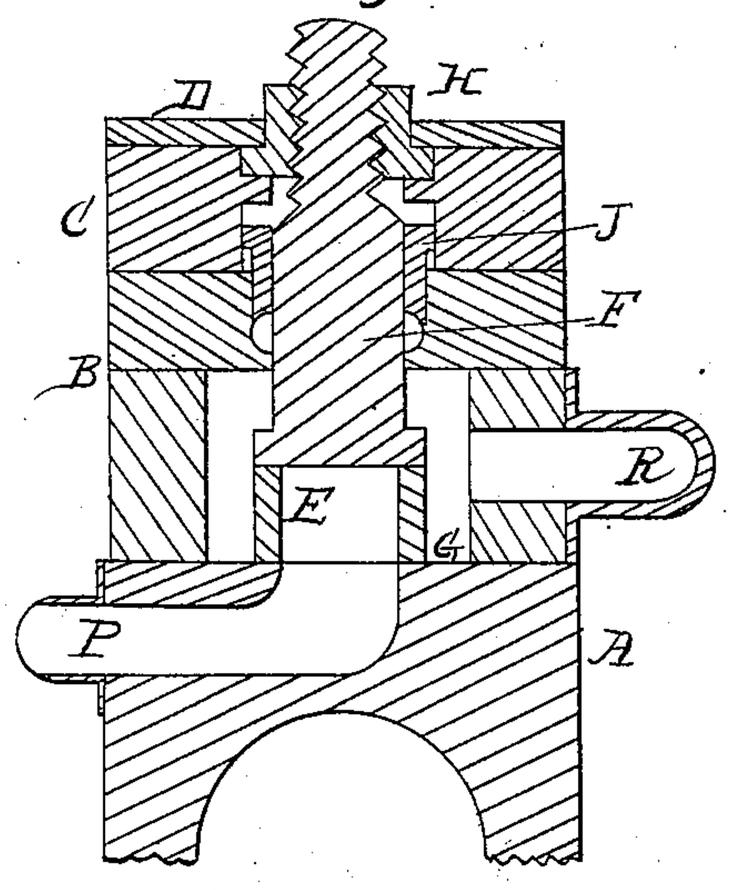

Fig: 1.

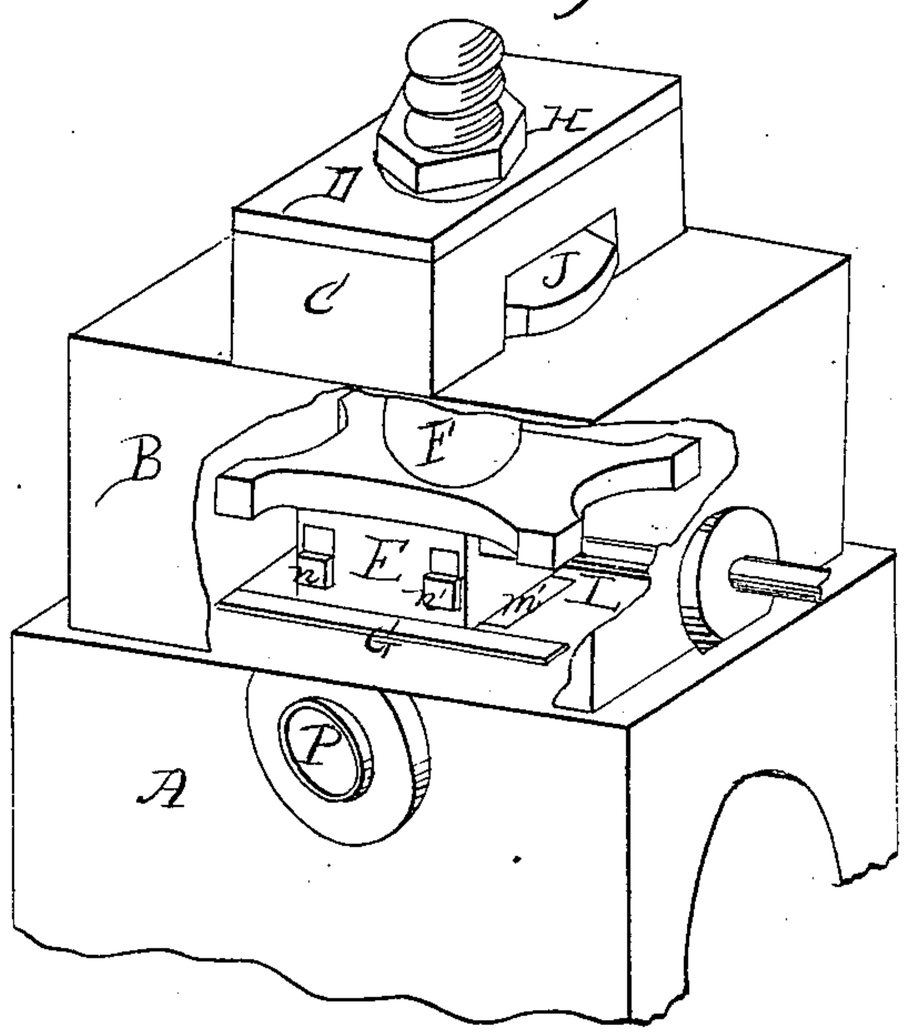

Fig: 4.

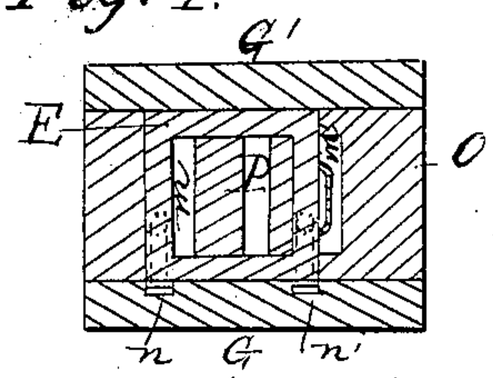

Fig: 5.

Witnesses.
Jacob Brewer
George Prinz

Inventor.
Peter Shearer.

UNITED STATES PATENT OFFICE.

PETER SHEARER, OF READING, PENNSYLVANIA.

IMPROVEMENT IN VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **37,644**, dated February 10, 1863.

To all whom it may concern:

Be it known that I, PETER SHEARER, of Reading, Berks county, and State of Pennsylvania, have invented a new and useful improvement on slide-valves used in steam and air engines, whereby excessive pressure and friction on said valves are avoided; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of the cylinder A, having the lower half cut off, of the steam-chest B, with a portion of two of its sides broken away, and of the slide-valve E and parts appertaining thereto. Fig. 2 is a vertical longitudinal section. Fig. 3 is a vertical transverse section. Fig. 4 is a plan of the slide valve E, valve-seat O, and the guides G G′. Fig. 5 is a vertical transverse section of the slide-valve E through the valve *n*, showing the communication through the latter between the cylinder and steam-chest.

Similar letters refer to corresponding parts in the different figures.

The object intended to be accomplished by this invention is to construct the slide-valve in such manner that it will not be subject to unnecessary pressure by the steam in the steam-chest, and that the friction and wear of the valve may be reduced as far as practicable without causing leakage.

In the drawings, A represents the upper part of the cylinder, on which the slide-valve E has its seat. *m* and *m′* are the ports communicating between the steam-chest B and the cylinder A. P is the exhaust; R, Fig. 3, the induction-pipe; O, Fig. 4, the valve-seat; E, the slide-valve; F, a lid or cover on the slide-valve E, consisting of an upright cylindrical stem enlarged at the base, so as effectually to cover and close the slide-valve E, and running through a stuffing-box in the steam-chest B, secured steam-tight by means of the gland I, and having a screw cut on its external part.

C is a block resting and firmly bolted on the steam-chest B, in which the nut H turns, whereby the valve-cover F may be elevated or depressed at pleasure. The nut H has a flange on its base, which rests on an inwardly-projecting rim in the block C, and is held in its position by the lid D, which is rigidly fixed on the block C.

n and *n′*, Figs. 1, 4, and 5, are small valves in the slide-valve E, which open and close communication through the fore and back sides of the latter between the cylinder and steam chest whenever the said sides of the slide-valve E pass over or rest upon the ports *m m′*.

L is the valve-stem of the slide-valve E, working, as usual, through a stuffing-box. G G′, Figs. 1 and 4, are guides to keep the slide-valve E in place.

The slide-valve E, which, with its appurtenances, constitutes this invention, is constructed like ordinary steam slide-valves, with the exception and peculiarity that it is open at the top and slides steam-tight underneath the cover F. There is no direct pressure of steam on the slide-valve E, the only downward pressure to which it is subject being that which the cover F exerts in that direction. This pressure is not intended to be produced by means of the nut H, but it arises from the downward pressure of the steam in the steam-chest on the lower port or rim of the cover F, which overlies the slide-valve E. The force with which the steam presses downward on the lower edge of F depends upon the relative horizontal areas of the slide-valve E and a cross-section through F, where it passes through the stuffing-box. To illustrate, if the slide-valve E covers a surface of one hundred square inches of its seat, and a cross-section of the stem of F forms an area of only ninety square inches, it is evident that the steam in the steam-chest will produce a downward pressure of ten square inches on the lower and enlarged portion of the cover F. The slide-valve E will therefore sustain a pressure of ten instead of one hundred square inches of steam.

The pressure on the slide-valve E may be wholly removed or reduced to any desired extent by simply diminishing the difference between the areas covered by the slide-valve E and formed by a transverse section of the stem of F.

The principal object of the nut H is to hold the cover F in its place. A sudden upward pressure of the steam in the cylinder A against the side of the steam-valve E, as it passes over one of the ports, produced by a reversal of the

engine or other cause, might otherwise raise the said valve and its cover, breaking the contact between the same, and opening a passage for the steam through the exhaust. Nevertheless the nut H may be employed to either augment or diminish the pressure on the slide-valve E whenever the same may become advantageous by reason of an increase or decrease of the tension of steam in the boiler or other cause.

The lower and enlarged portion of the cover F has projecting corners, as shown in Fig. 1, which slide against the sides of the steam-chest B, to prevent the said cover F from turning with the nut H, and to obviate the strain on the stem of F by the action of the slide-valve E.

The object of the small valves *n n'*, Figs. 1 and 5, in the slide-valve E is to open a passage for the steam from the cylinder A into the steam-chest B whenever the action of the piston in the cylinder presses the steam upward as the fore or back part of the slide-valve E traverses the ports *m m'*. The valves *n n'* are indispensable, because the slide-valve E is prevented from rising in such event by the cover F. The valves *n n'* are self-acting, invariably preventing the passage of steam through them from the steam-chest, and only opening the communication under the circumstances before explained. The guides G G', Fig. 4, serve to keep the slide-valve E in line of action. Any other device may be employed to effect the same purpose.

The attachments generally used to cut off steam and reverse the engine may be applied with the same facility to this as to any other slide-valve.

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

The slide-valve E, open at the top, with the valves *n n'*, or their equivalent, in combination with the cover F, applied to each other and operating substantially as herein set forth.

PETER SHEARER.

Witnesses:

JACOB BREWER,

GEORGE PRINTZ.