

(No Model.)

2 Sheets—Sheet 1.

J. B. BARNES.  
BALANCED SLIDE VALVE.

No. 406,557.

Patented July 9, 1889.

FIG. 1.

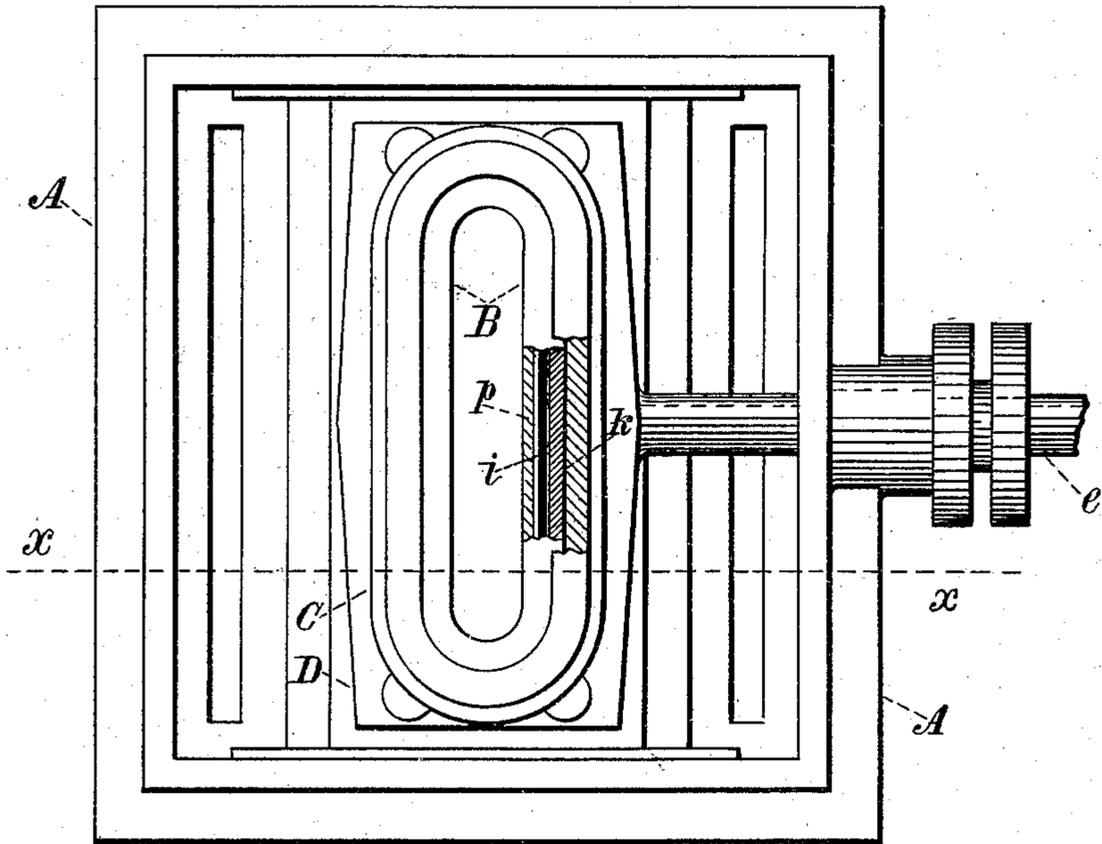
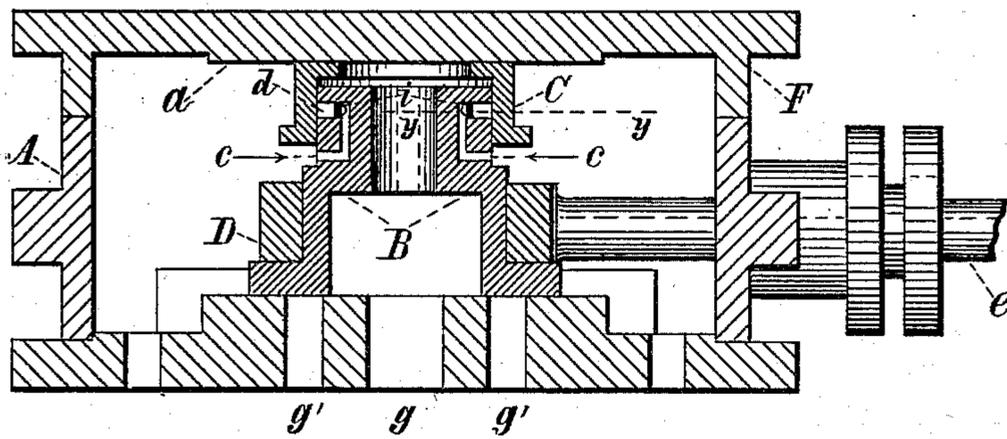


FIG. 2.



WITNESSES:

*A. W. Newton.*  
*J. Lewis*

INVENTOR

*Joshua B. Barnes.*  
BY *J. S. Davenport.*

ATTORNEY.

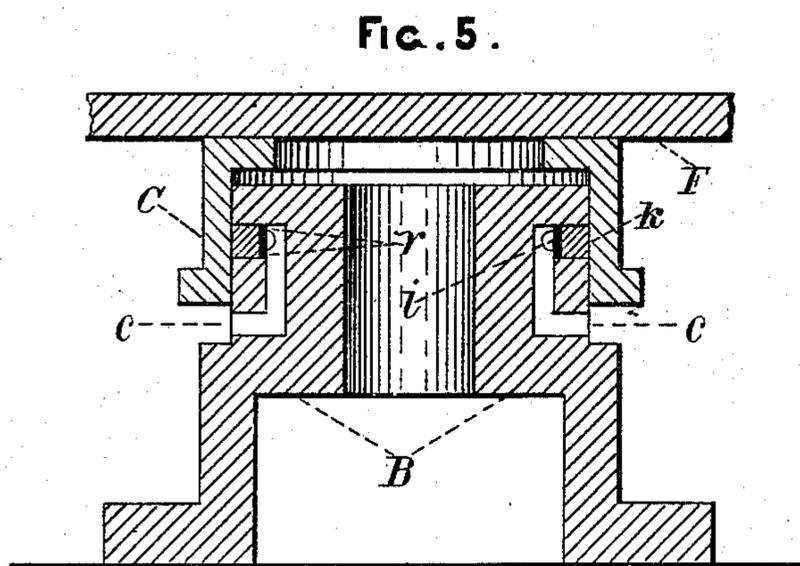
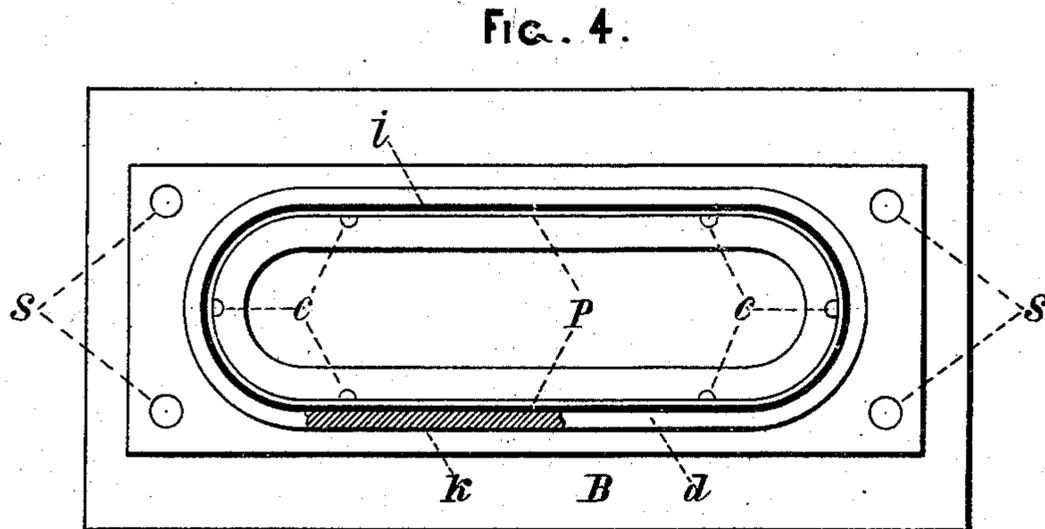
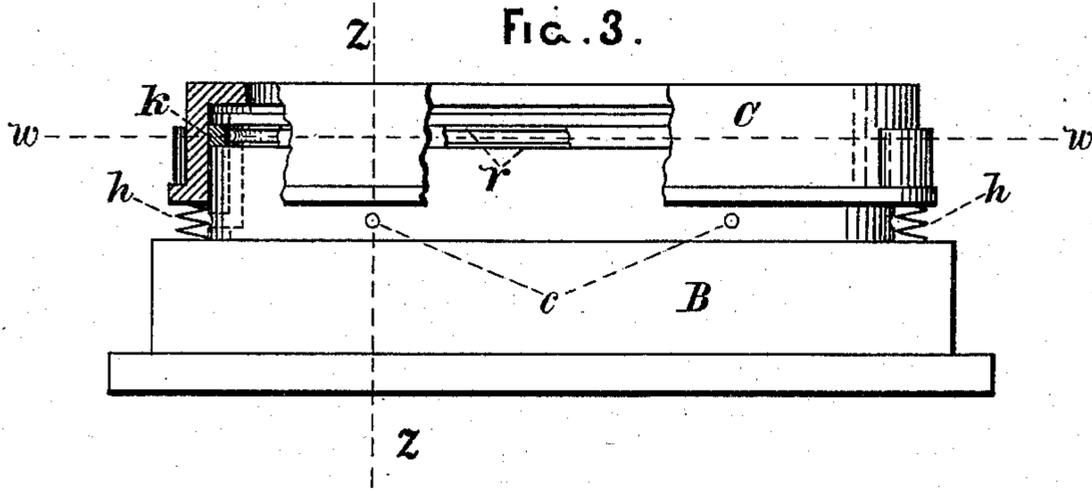
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*A. Newton.*

*R. Newton.*

INVENTOR:

*Joshua B. Barnes.*  
BY *F. S. Davenport,*

ATTORNEY.

# UNITED STATES PATENT OFFICE.

JOSHUA B. BARNES, OF SPRINGFIELD, ILLINOIS.

## BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 406,557, dated July 9, 1889.

Application filed February 16, 1889. Serial No. 300,194. (No model.)

*To all whom it may concern:*

Be it known that I, JOSHUA B. BARNES, of Springfield, in the county of Sangamon and State of Illinois, have invented a new and improved Balanced Slide-Valve; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to an improvement in balanced slide-valves for steam-engines of that type in which a free rider or cap is adapted to slide upon the crown of the valve in a direction perpendicular to its face and against the inside of the steam-chest cover, said cap or rider being made steam-tight round the crown of the valve by packing set out by the pressure of the steam, the cap or rider being sustained against the steam-chest cover by springs.

The object of my contrivance is to exclude the ingress steam from the greater portion of the back of the valve by a novel system of packing round the crown thereof, in combination with a ring or rider of such construction that the packing round the crown of the valve will be automatically tightened against said rider, or relaxed, as the steam-pressure fluctuates in the steam-chest, and, further, so that every irregularity or inequality due to expansion or wear will to a great extent be compensated independent of the elasticity of the material of which the packing consists.

In the drawings, Figure 1 is a plan view of my valve shown within the steam-chest. Fig. 2 is a sectional view of the same, taken in the line  $x x$ , Fig. 1, showing the steam-chest cover in position. Fig. 3 is an enlarged front elevation of the valve, showing a portion of the rider broken away to exhibit the groove for the reception of the packing in the crown of the valve. Fig. 4 is a plan view of the same, showing the crown of the valve in section, taken in the line  $w w$ , Fig. 3. Fig. 5 is a still further enlarged sectional view of the valve, taken in the line  $z z$ , Fig. 3, in connection with a portion of the steam-chest cover.

A in the figures represents the steam-chest; B, the slide-valve; C, the ring or rider adapted to encircle the crown of the valve and slide vertically thereon, so that its upper face or

rim will be in contact with the inner face  $a$  of the steam-chest cover F. (See Fig. 2.)

D represents a valve-yoke of the ordinary form, and  $e$  the spindle thereof.  $g' g'$  represent the steam-ports, and  $g$  the exhaust-port.

In Fig. 1 a portion of the crown of the valve and rider is shown in section, taken in the line  $y y$ , Fig. 2.

It will be observed that the front and rear of the crown part of the valve are provided with small steam-passages  $c$ . (Indicated by arrows in Fig. 2, and more clearly shown in the larger Fig. 5.) These passages are for the purpose of admitting steam from the interior of the steam-chest to the groove  $d$ , with which the crown of the valve is provided all round. (See Fig. 3.) Near the semicircular bottom of said groove, and resting against shoulders or ledges  $r$ , (see Figs. 3 and 5,) provided for its reception, so as to preserve a cavity or channel behind it for steam, is a thin ring or band of brass  $i$ , which may be made in two or more segments, preferably, however, in two equal parts divided in the middle of its main length, as shown at P, Figs. 1 and 4. Outside this ring or band  $i$ , and in contact with it, is a packing  $k$ , Figs. 3 and 4, of asbestos or other suitable material, adapted to impinge on the internal surface of the rider C.

To sustain the weight of the rider and press it against the inner face  $a$  of the steam-chest cover, it is provided with a spiral spring  $h$  at each of the four corners, cavities being made in the valve, as shown at S, Fig. 4, and corresponding cavities in the under side of the rider for the reception of the ends of said springs. Matters being thus, it will be observed that when steam is admitted to the steam-chest it will rush into the steam-passages  $c$ , and thence behind the band or ring  $i$ , forcing out the latter, and consequently with it the packing, against the rider with a force varying with the pressure of the steam, so that said packing will be automatically tightened or relaxed with every fluctuation of the steam-pressure.

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

In a balanced slide-valve for steam-engines,

said valve having a cap or rider adapted to slide steam-tight against the inner surface of the steam-chest cover, and made steam-tight upon the crown part of the valve by packing  
5 located in a groove extending entirely round the crown of the valve, the combination of steam-passages *c*, having their ingress-orifices in the exterior lower part of the crown of the valve and their egress-orifices in the packing-  
10 groove *d*, the packing ring or band *i*, ledges or shoulders *r*, a semicircular channel in the

bottom of the groove *d*, and supporting-springs *h*, all of said parts constructed and adapted to operate substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 12th day of December, 1888.

JOSHUA B. BARNES.

Witnesses:

C. F. LAPE,

S. W. JEFFERY.