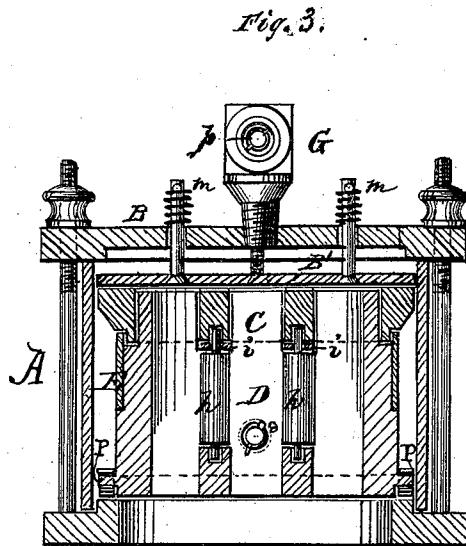
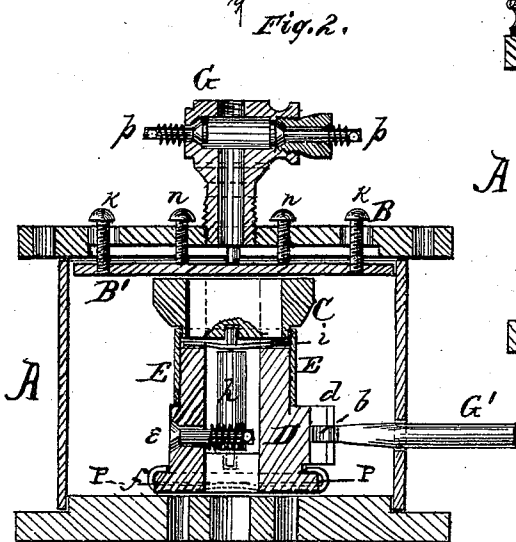
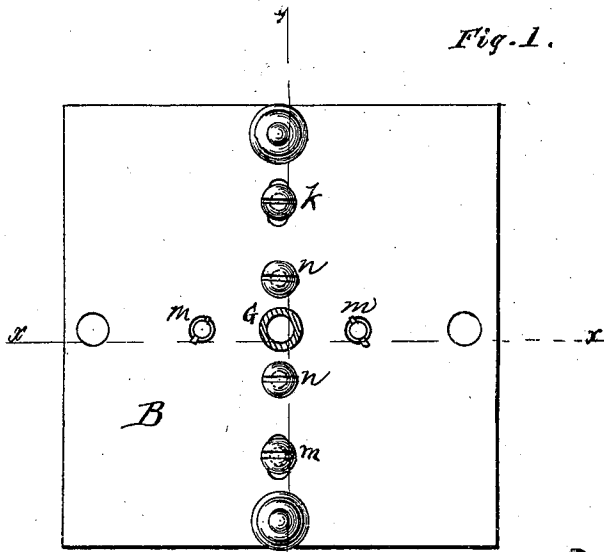


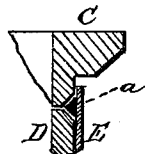
**F. STRATTNER.**  
**Balance Slide-Valves.**

No. 148,523.

Patented March 10, 1874.



WITNESSES:  
*P. C. Dieterich*  
*Harry C. Scott*



INVENTOR,  
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per. *C. H. Watson & Co.*  
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# UNITED STATES PATENT OFFICE.

FREDERICK STRATTNER, OF WILMINGTON, DELAWARE.

## IMPROVEMENT IN BALANCE SLIDE-VALVES.

Specification forming part of Letters Patent No. 148,523, dated March 10, 1874; application filed February 10, 1874.

*To all whom it may concern:*

Be it known that I, FREDERICK STRATTNER, of Wilmington, in the county of New Castle and State of Delaware, have invented certain new and useful Improvements in Self-Adjusting Balance Slide-Valves; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The nature of my invention consists in the construction and arrangement of a self-adjusting balance slide-valve for locomotive and other engines, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a plan view, Fig. 2 a transverse vertical section, and Fig. 3 a longitudinal vertical section, of my valve and chest.

A represents the steam-chest with cover B. The slide-valve is made in two parts, C and D, the upper section C being of proper size to seat itself against the inside cover or plate B', as shown in Figs. 2 and 3. The cover B, when screwed down tight against the chest, will spring up in the center, which would make it difficult to make a steam-tight joint; but the instant the steam strikes the upper section it forces it against the cover or plate B', when it does not matter whether the cover is sprung or not, as the joint is formed between the upper section C and the inside cover or plate B'. The joint between the two sections of the valve is broken by means of a band, E, of thin metal, which may be made in one or more pieces, according to the size of the valve. By the use of this band it requires no particular fitting, as the band will make a perfect joint on a casting taken out of the sand. The band E is fastened on by rivets or screws, sufficiently far apart to make the band or apron free enough to allow air to pass between it and the valve when the engine is not using steam.

In a locomotive, when running down a grade, not using steam, the instant the steam is shut off, there will be vacuum created in the steam-

chest, and by having the band or apron loose on the valve, the piston will draw air through the band. This band or apron being of thin or pliable metal, the instant that the steam strikes it it is pressed against the valve and makes a solid valve of the two sections.

A V-shaped strip, *a*, with its ends overlapping the corners, may be used in large valves by fitting it in between the upper and lower sections of the valve, where they meet, by which device the space will be taken up as the valve wears at the top and bottom by having the edges at the joint beveled. It will also prevent the band from setting in said bevels.

In place of the band, either one of the sections may be reduced at the joint to a feather-edge and overlapping the other, if so desired. In that case the corners must be cut to allow the steam to set them together, and these corners to be made perfectly steam-tight by means of thin strips of metal riveted at one end and overlapping the cut corners, so that the steam will set them in and make them steam-tight.

G' represents the valve-stem, provided on its inner end with a T-head, *b*, and on the side of the valve are L-shaped flanges *d*, between which said head fits, so that the valve can easily be removed without raising the chest from its place. The lower section D is provided with one or more air-valves, *e*, to supply the air that the cylinder may require, when not using steam, by drawing it through the cavity of the valve. When the chest is filled with steam, the valve is held down on the bottom of the chest on its seat by the pressure of the steam on the lid or projection P; but under the valve at each end is a spring, *f*, for the purpose of raising the valve off the seat the instant that the throttle is shut, thereby making it impossible for the piston to form a vacuum in the chest, as the air will pass in and out under the valve. In the lower section D of the valve are studs *h h*, with springs *i i* bearing against the upper section C, for the purpose of keeping the same apart. The steam-chest cover B has an inside movable plate, B', held by means of screws *k k*, and thus forming a double cover. Through the cover are air-valves *m m*, placed directly over the back or cavity of the valve, to supply air to the cylinder indirectly, it being conducted to the cylin-

der by the action of the valve. By this arrangement, the piston will draw pure air into the cylinder when the engine is reversed or in back gear. When it is necessary to reverse the gearing to stop the engine, which is often the case, the instant that the gearing is reversed, the piston will draw air through the exhaust-pipes, thereby drawing cinders and ashes into the cylinders, and into the steam-chest and pipes, often cutting the valves. By placing the air-valves *m m* over the cavity of the slide-valves, they will be nearer to the valve than the exhaust-pipes, and they will, therefore, supply the air. *n n* are set-screws to force the parts *B B'* of the cover apart, and straighten the lower part or plate *B'* to make it a true face for the upper section *C* of the valve to work against. The space between the parts *B* and *B'* is to contain air. This space may also contain steam by having a small hole through the plate *B'*, in which case the set-screws are not necessary, as the steam will answer the same purpose. *G* represents a connection for the oil-cup to be screwed on. This is screwed into the cover *B*, and provided with air-valves *p p*. In using a self-oiler on steam-chests, the piston often draws the oil out of the cups when running shut off. The valves *p p* open the instant the steam is shut off, and when the piston should draw or form a vacuum it will be supplied through said air-valves, they being below the oil-cup, and will, therefore, stop the action on the lubricator.

The balancing of the valves is accomplished by the upper section of the valve. By increasing the upper section the pressure is removed, and by decreasing the upper section the pressure is increased on the lower section. As it depends on the displacement of the upper section altogether, it can be balanced to an exact point.

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

1. The band or apron *E*, in combination with the sections *C D* of a balance slide-valve, arranged substantially as and for the purpose herein specified.

2. The springs *f*, arranged under the valves *C D*, for the purpose herein specified.

3. The valves *C D* and inside cover or plate *B'*, in combination with the set-screws *n n*, constructed and arranged as and for the purpose herein described.

4. The valves *C D*, constructed with lip or projection *P* and the spring *f*, in combination with the inside cover or plate *B'* and cover *B*, when constructed and arranged substantially as and for the purpose herein set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

FREDK. STRATTNER.

Witnesses:

HARRY CHRISTY,  
DAVID R. HAYES.