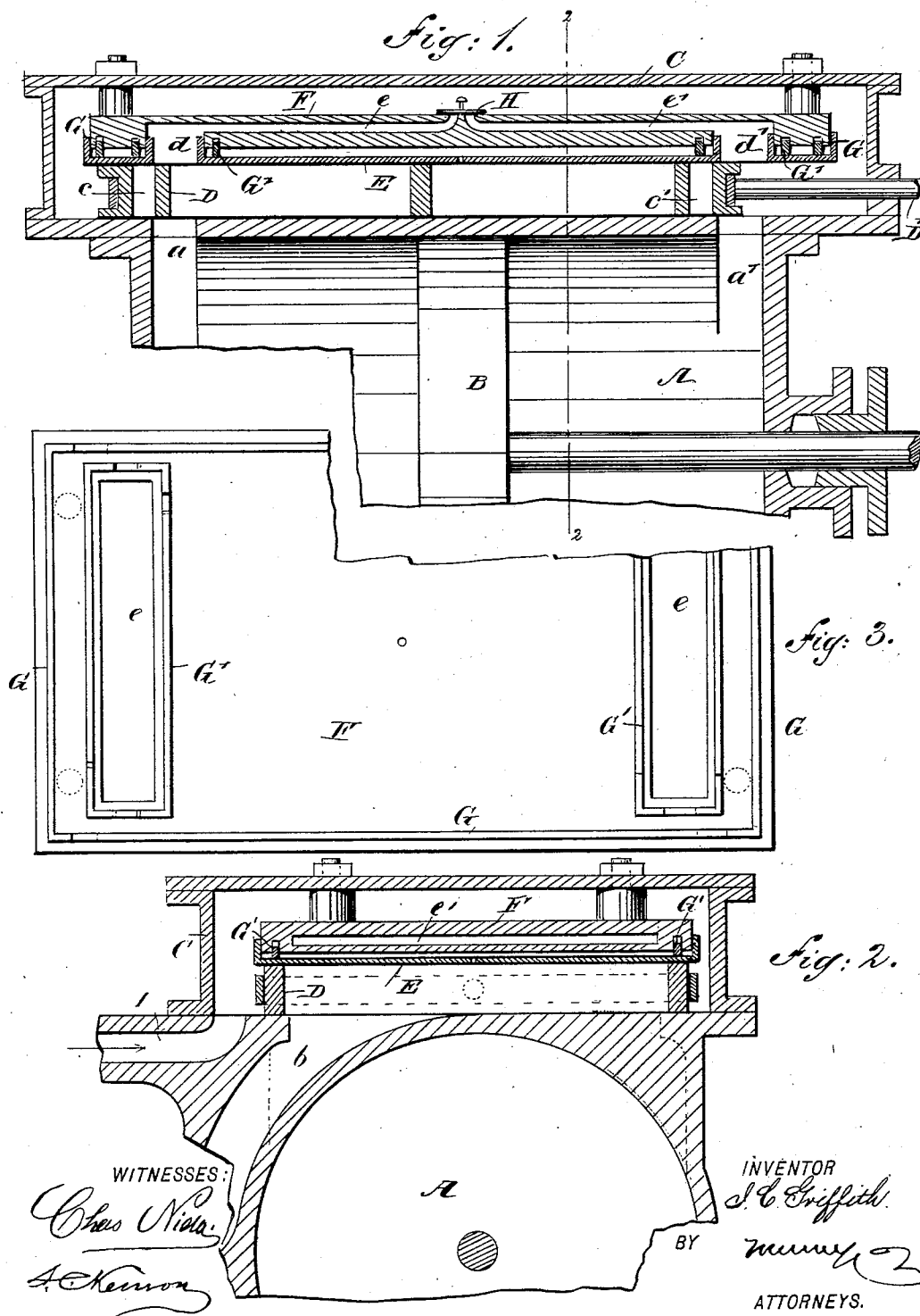


(No Model.)

I. C. GRIFFITH.
BALANCED SLIDE VALVE.

No. 588,119.

Patented Aug. 10, 1897.



UNITED STATES PATENT OFFICE.

ISAAC C. GRIFFITH, OF VICKSBURG, MISSISSIPPI, ASSIGNOR TO HIMSELF
AND FREDERIC SPEED, OF SAME PLACE.

BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 588,119, dated August 10, 1897.

Application filed March 4, 1896. Serial No. 581,836. (No model.)

To all whom it may concern:

Be it known that I, ISAAC C. GRIFFITH, of Vicksburg, in the county of Warren and State of Mississippi, have invented a new and Improved Balanced Slide-Valve, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved balanced slide-valve which is simple and durable in construction, very effective in operation, and arranged to permit a quick admission and exit of the steam to and from the cylinder without undue friction of the steam in the ports, at the same time permitting a free exhaust of the steam.

The invention consists of a slide-valve having ports adapted to register with the cylinder-ports for returning air or steam from the latter and a balance-plate held in the steam-chest and provided with ports adapted to register with the said slide-valve ports.

The invention also consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a transverse section of the same on the line 2 2 of Fig. 1, and Fig. 3 is an inverted plan view of the balance-plate.

The cylinder A is provided with the usual reciprocating piston B and is also provided at its ends with the ports *a* and *a'*, opening into the steam-chest C, in which reciprocates a slide-valve D, having a valve-stem *D'*, connected with the usual mechanism for imparting a reciprocating motion to the said slide-valve to open and close the ports *a* and *a'* to admit steam to the cylinder or to permit the exhaust to escape through the exhaust-port *b*. (See Fig. 2.)

On top of the slide-valve D rests a face-plate E, forming part of the balance-plate F, supported by bolts or other suitable means from the cover of the steam-chest C, as is plainly illustrated in Figs. 1 and 2. Between the balance-plate F and the face-plate E is introduced a suitable packing G to prevent leakage of steam and also to prevent the

packing from being in contact with a rubbing-surface, as is so frequently the case in ordinary balanced slide-valves in which the packing is introduced directly between the slide-valve and the balance-plate.

In the slide-valve D are arranged vertically-disposed ports *c* and *c'*, adapted to register with the ports *a* and *a'* and also adapted to register at their upper ends with the relief-ports *d* and *d'*, formed in the face-plate E and leading to channels *e* and *e'*, formed within the balance-plate F. Over the inner ends of the said channels *e* and *e'* is held a valve or button H, adapted to open the said channels into the steam-chest at the time the back pressure comes from the cylinder.

The sides of the relief-ports *d* and *d'* fit into channels in the under side of the balance-plate F, as is plainly shown in Fig. 1, and in order to prevent leakage between the ports *d d'* and the channels *e e'* I employ a packing G', arranged in the under side of the balance-plate F and surrounding the sides and ends of the said ports, as will be readily understood by reference to Fig. 3.

When the engine is started, then the steam admitted to the steam-chest through the inlet-pipe I passes alternately to the ends of the cylinder A by the ports *a* and *a'* as the latter are uncovered by the reciprocating motion of the valve D, and the exhaust-steam passes from the ends of the cylinder through the said ports to the exhaust-port *b*, and thence to the outer air. It will be seen that by this arrangement the slide-valve D is in contact at its top surface with the under side of the face-plate E and not with the packings G and G' interposed between the face-plate and the balance-plate F. This packing G G' is made of an indestructible and expansive material, such as asbestos, and gives sufficiently to firmly hold the face-plate E at all times in frictional contact with the slide-valve D. I may also use a metal flange integral with the face-plate, fitting in recesses in the balance-plate, in which is the asbestos. In case steam should leak from the steam-chest or slide-valve between the packing-rings around the edge of the face-plate then it will pass into the middle of the slide-valve D and to the exhaust-port *b* through an opening in its center. This opening will also serve to balance the

pressure or face plate from steam in middle of the valve.

The ports *d* and *d'* are of about the same area as the ports *a* and *a'*, so that when either of the latter ports is closed after the admission of steam to the cylinder then the back pressure from the cylinder will be exerted on the balance-plate *F* through the registering ports *a c d* and *a' c' d'*, respectively. Thus no pressure is exerted against the face-plate *E*, and consequently no additional pressure is given to the slide-valve *D*, so that the latter can move freely even in case back pressure exists in the cylinder. By this arrangement a like pressure is exerted at all times on the slide-valve *D*, both upward and downward, thus perfectly balancing it in all its positions during the entire travel.

The channels *e* and *e'* permit the compressed air or steam in one end of the cylinder to pass from the latter to the registering ports *a c d* or *a' c' d'*, to the said channels *ee'*, respectively, into the steam-chest *C*, and from there into the other end of the cylinder to relieve the vacuum therein at the time the valve is linked up in the center and the engine is moved downgrade without steam. The said channels *e* or *e'* also provide a passage back into the steam-chest for any steam that is shut in the cylinder against an advancing piston-head, as is so frequently the case in reversing the engine.

The steam when compressed in the cylinder to more than boiler-pressure will readily flow back into the steam-chest, it being understood that the said steam lifts the valve or button *H* and passes from the corresponding channel into the chest, and thus all danger of blowing off the steam-chest or cylinder-heads is prevented.

The slide-valve is so equally balanced that the only force necessary to operate it is that required to move the weight of the valve and overcome the slight friction caused by its weight and the pressure of the face-plate *E* on top of the said valve.

The packing can be metal with asbestos or other expansive packing pressed into the recesses in the under side of the balance-plate,

or the face-plate may have projections fitting into said recesses and pressing upon the expansive packing, the upper edge of the projections being grooved or hollowed to prevent the blowing of the packing, the expansive pressure of the packing forcing the face-plate down sufficiently to insure a steam-tight joint between it and the top of the valve.

I do not limit myself to the especial construction of valve and other parts shown, as the same may be varied according to the construction of the engine.

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

1. A balanced slide-valve, provided with a balance-plate having a face-plate, and a packing interposed between the under surface of the said balance-plate and the upper surface of face-plate, substantially as shown and described.

2. A balanced slide-valve, comprising a slide-valve having ports adapted to register with the cylinder-ports, a face-plate held on top of the said slide-valve and provided with relief-ports adapted to register with the said valve-ports and the cylinder-ports, and a balance-plate on which fits the said face-plate and provided with channels connected with the relief-ports in the said face-plate, substantially as shown and described.

3. A balanced slide-valve, comprising a slide-valve having ports adapted to register with the cylinder-ports, a face-plate held on top of the said slide-valve and provided with ports adapted to register with the said valve relief-ports, a balance-plate on which fits the said face-plate and provided with channels connected with the relief-ports in the said face-plate, the inner ends of the said channels opening into the steam-chest, and a button or valve adapted to close the said inner ends of the channels, substantially as shown and described.

ISAAC C. GRIFFITH.

Witnesses:

W. A. HOPPER,
JOHN B. A. BRUNINI.