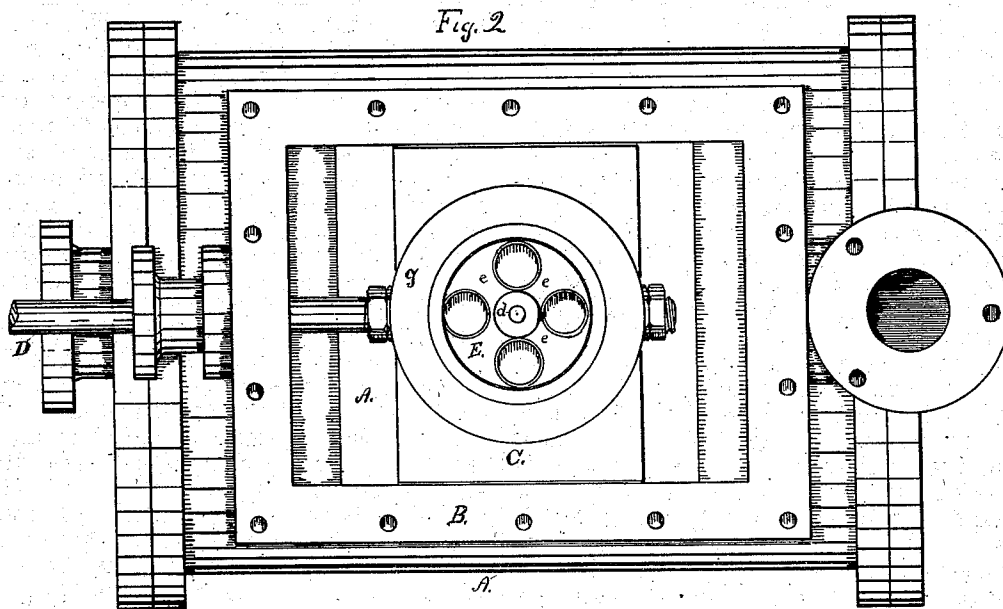
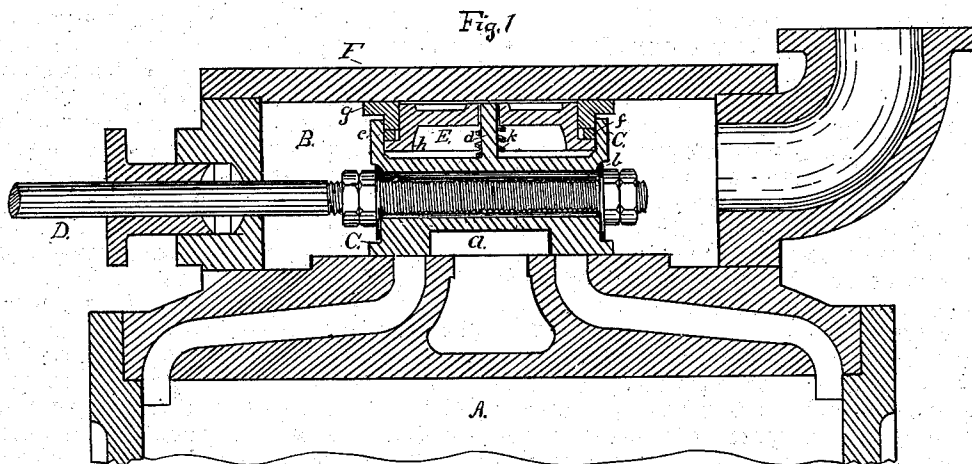


A. RODGERS.
Balanced Slide-Valves.

No. 155,755.

Patented Oct. 6, 1874.



Attest.
M. P. Harwood.
W. D. Jordan

Inventor.
Alexander Rodgers
 By
Andrew R. Brown,
Atty.

UNITED STATES PATENT OFFICE.

ALEXANDER RODGERS, OF MUSKEGON, MICHIGAN.

IMPROVEMENT IN BALANCE SLIDE-VALVES.

Specification forming part of Letters Patent No. **155,755**, dated October 6, 1874; application filed May 29, 1874.

To all whom it may concern :

Be it known that I, ALEXANDER RODGERS, of Muskegon, in the county of Muskegon and State of Michigan, have invented certain new and useful Improvements in Balance Slide-Valves; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to that class of slide-valves commonly called balance-valves, they being so constructed as to relieve the valve of a portion of the pressure consequent to the admission of steam over the whole surface of their backs; and the invention consists in the means used for reducing the area of surface which is exposed to the direct pressure of the steam, and thereby reducing the friction between the valve and the cylinder-face, as will be hereinafter described, and then set forth in the claim.

In the accompanying drawings, similar letters of reference indicate corresponding parts in the different figures.

Figure 1 is a longitudinal section through the valve and steam-chest. Fig. 2 presents a plan of the valve, the steam-chest cover having been removed.

The steam-cylinder is represented by that portion of the device marked A, and the steam-chest by that marked B, both of these parts being constructed in any of the forms usual in engines operated by the slide-valve. C is the valve, provided with the exhaust-opening *a*, and a longitudinal orifice, *b*, through which passes the valve-rod D. This orifice is made sufficiently large to allow the passage of steam through it freely from one end to the other of the valve-chest, the valve-rod being retained in position by means of two adjustable nuts secured upon the rod each side of the valve, and which bear against washers inserted in recesses formed for them in its ends. A cylindrical case, *c*, is cast upon the back of the valve, and bored out for the reception of the piston E. This piston is formed with a central hub connected with its periphery by the

arms *e*, and perforated at its center, so as to receive the guide-pin D. It is also provided with a projecting flange, *h*, which supports the packing-ring *f* and junk-ring *g*. This junk-ring is provided with a broad wearing-surface or flange, upon which rests the steam-chest cover F, while its lower part passes down into and fills the annular space between the cylindrical case of the valve and the piston, the flange overlapping the case. Between this junk-ring and the flange *h* of the piston is placed the packing-ring *f*, which is formed of brass, being turned to a circle of slightly greater diameter than the piston, and a piece cut out of it of such length as to allow it, when sprung together, to enter the cylindrical case *c*. The central guide-pin *d* is cast with and forms a part of the valve, and may be turned to a perfectly-cylindrical form at the same time the case *c* is bored. This pin prevents the valve from being thrown forcibly against the steam-chest cover by the expansion of the steam within the cylinder and passages when it is suddenly shut off from the engine; and, as it is slightly shorter than the distance between the valve-back and the steam-chest cover, it will allow the valve to rise sufficiently to permit the exit of water from the cylinder, and it keeps the packing-ring pressed firmly against the junk-ring, and at the same time forms a support for the helical spring *k*, which is made of a flat bar of steel coiled upon a mandrel slightly larger than the pin *d*, so that, when it is placed in its position between the back of the valve and hub of the piston, it shall move easily upon the pin, and tend to keep the packing-ring pressed firmly against the junk-ring, and at the same time force the piston outward against the steam-chest cover, the inner side of which is brought to a plane smooth surface, thus forming a steam-tight joint between it and the valve, leaving only the small triangular spaces at the corners of the valve outside of the cylindrical case to receive the direct pressure of the steam. A lubricator is placed upon the steam-chest, the opening through which serves not only to admit lubricants to the valve, but allows the escape of any heated air or steam which may be within it; or, should the engine be provided with a condenser, a pipe may connect this part

directly with it, thus employing the vacuum therein to assist in reducing the load upon the valve.

This method of construction is found by experience to present several novel features possessing great advantages, among which may be enumerated the guide-pin cast with the valve, the method of constructing the packing-ring, and the simple arrangement and small number of parts, enabling the constructor to furnish an efficient balance-valve for much less than such devices have commonly cost.

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

The valve provided with the cylindrical case *c* and pin *d* cast thereon, in combination with the spring *k*, piston *E*, packing-ring *f*, and junk-ring *g*, substantially as and for the purpose set forth.

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

ALEXANDER RODGERS.

Witnesses:

E. MCB. TIMONEY,

W. L. CALDWELL.