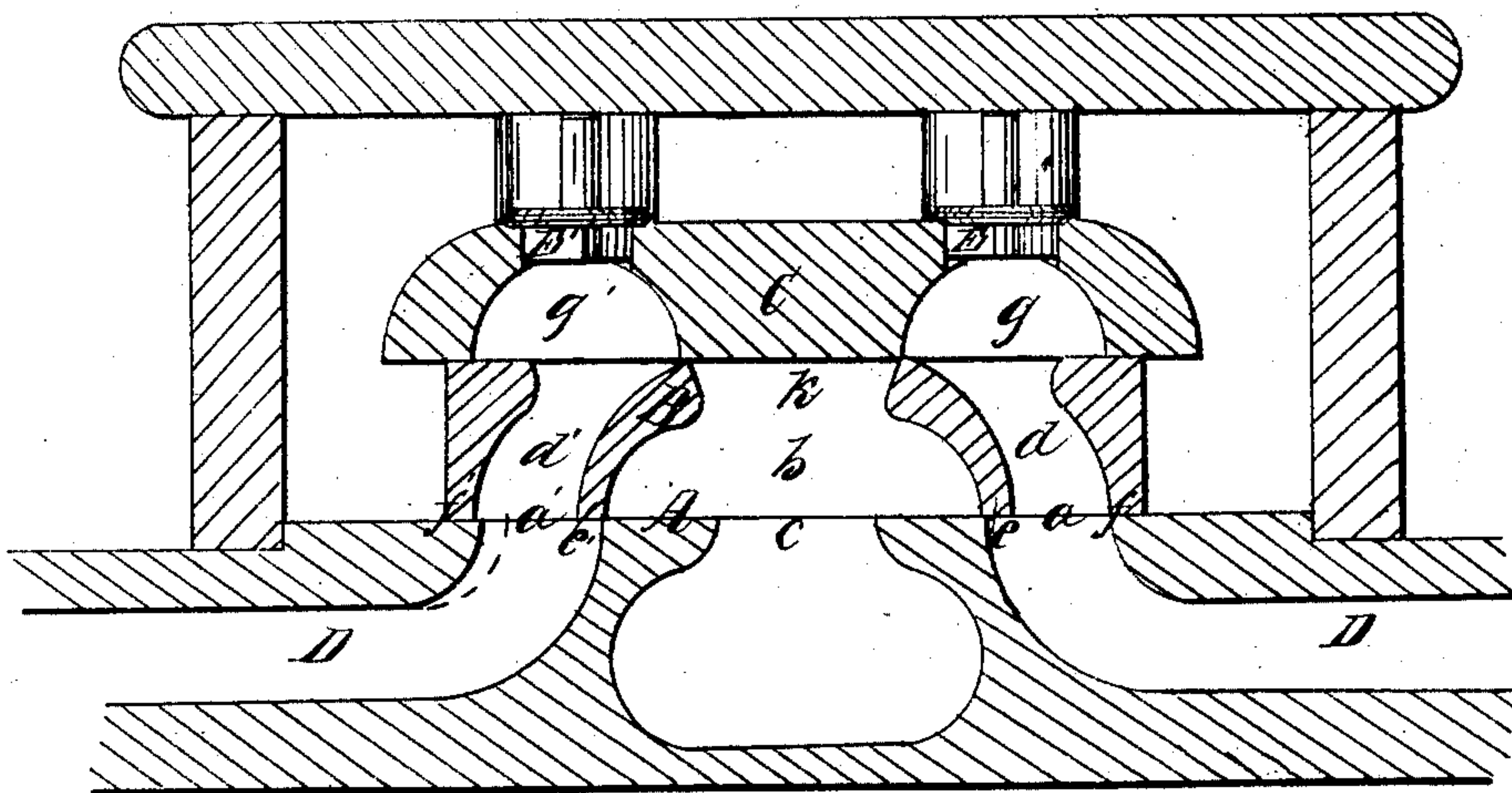
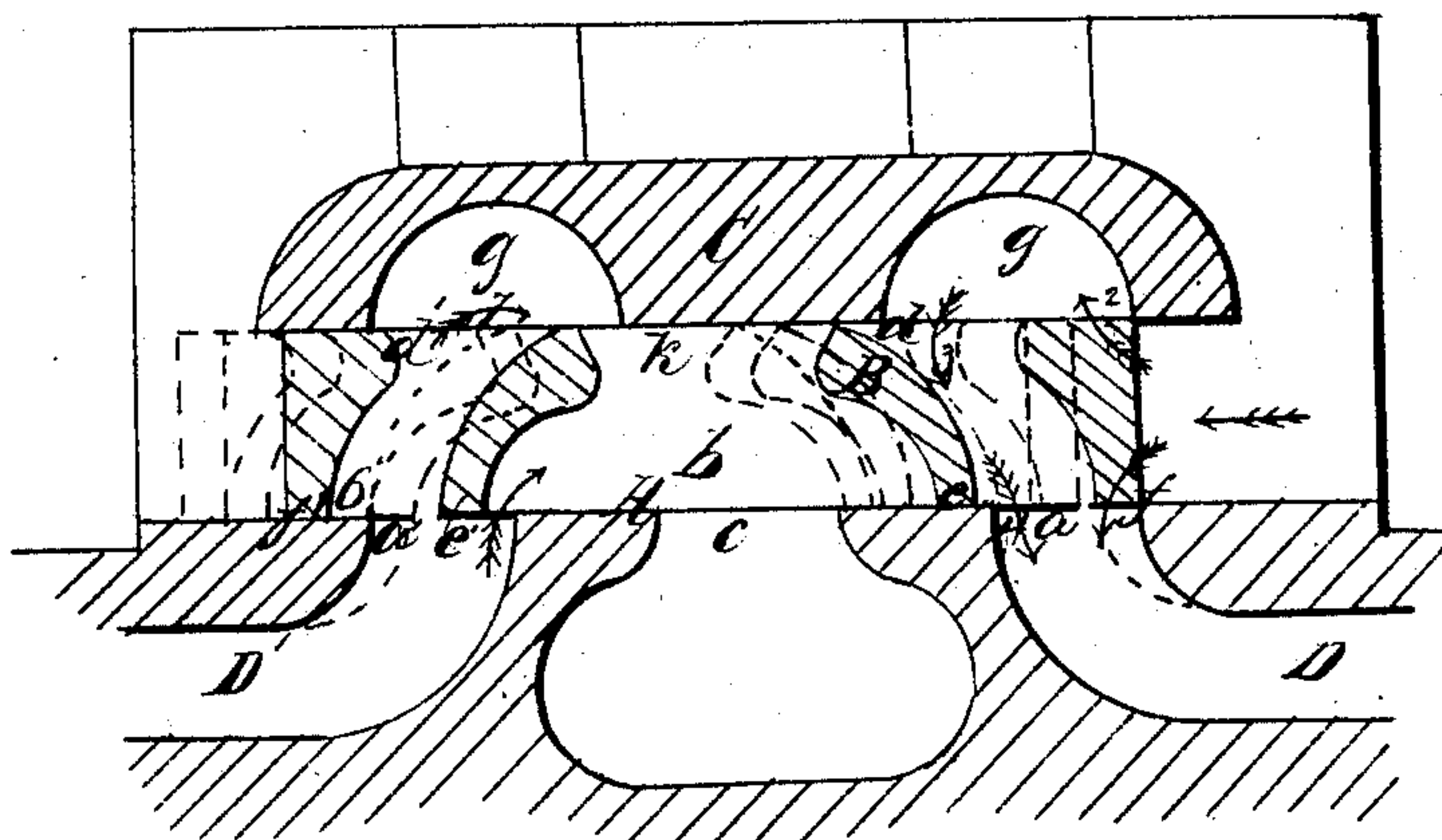


*J. Gleason,*  
*Steam Balanced Valve.*  
*No 11,607.      Patented Aug. 29, 1854.*

*Fig: 1.*



*Fig: 2.*





# UNITED STATES PATENT OFFICE.

JOHN GLEASON, OF NORTHFIELD, VERMONT.

## SLIDE-VALVE FOR STEAM-ENGINES.

Specification of Letters Patent No. 11,607, dated August 29, 1854.

*To all whom it may concern:*

Be it known that I, JOHN GLEASON, of Northfield, in the county of Washington and State of Vermont, have invented certain new and useful Improvements in Slide-Valves and Steam-Chests of Locomotives and other Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figures 1 and 2 are both longitudinal sections of a steam chest and slide valve of a locomotive engine constructed according to my invention, showing the valve in different positions.

Similar letters of reference indicate corresponding parts in both figures.

My invention consists, firstly in a certain method of constructing the valve, combined with a certain arrangement of steam ports, and with the employment of a covering plate of peculiar construction covering the valve, whereby I effect two very desirable results at the same time, viz: the balancing of the valve, and the opening of the steam ports, to the full width, very early in the stroke of the engine.

My invention consists, secondly in the employment in the covering plate before mentioned of certain safety valves, whereby on the breaking or giving way of the valve gear all danger of bursting the cylinder by the compression of the steam in front of the piston is effectually obviated by allowing the steam to return through the steam way and valve into the steam chest.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The valve seat, A, only differs from the seat of the common slide valve, in having the steam ports (*a*, *a'*) widened to the extent shown in both figures of the drawing, where the ordinary width, which is the same as the width of the steam ways, D, D', is indicated by blue lines. This enlargement it will be seen is all on the outside, and is gradual commencing a short distance down the passage, and it makes the width of the ports about one-third greater than that of the steam ways.

The construction of the valve, B, will be best understood by reference to Fig. 1. It is made of uniform thickness, from end to end, and is faced parallel on its upper and

lower sides. Its length is such that when placed in a central position it laps over the outside edges of the ports, as shown in Fig. 1, to the extent of the increase in width of the ports above spoken of. The cavity (*b*) in the center of the valve through which the steam is exhausted is of such length as to be capable of extending exactly from the inner edge of one steam port, to the inner edge of the other, and from this cavity (*b*) there is an opening (*k*) through the back of the valve, which is of the same length as, but wider than, the exhaust port (*c*). Mid-way between the cavity (*b*) and the ends of the valve, there are two passages (*d'*, *d*) of the same length as the steam ports, and of the same width as the steam ways, D, D', at the part where there is no enlargement. The parts (*f*, *f'*) of the faces of the valve, between the ends of the valve, and the outer sides of the passages, and the parts (*e*, *e'*) between the said passages and the exhaust cavity (*b*) are all exactly equal in width, to the excess of the width of the steam ports above that of their passages, so that when either of the said parts of the face cover the ports, the port is still open to the full effective width, equal to the width of the steam way. The passages, through the valve do not extend directly upward square with the face but are curved toward the center.

The covering plate, C, is intended to be made of cast iron and bolted to the cover of the steam chest. It is faced on its under side to fit closely to the back of the valve, and in its face, there are two cavities, (*g*, *g'*) the outer sides (*h*, *h*) of which are directly opposite the outer edges of the steam ports, and the inner edges, (*i*, *i*) of which are at a distance apart equal to the width of the opening (*k*) in the back of the valve.

The operation of the slide valve is best illustrated in Fig. 2, where it is supposed to be moving in the direction of the black arrow, and is represented in black outlines and tinted, in the position it occupies, while the engine is on the center, and further represented in dotted outline, as having reached the end of its movement, and in red outline in the position it arrives at to give the full width of opening to the ports. As soon as the end of the valve passes the edge of the steam port, and the edge of the cavity (*g*) in the covering plate, the steam enters the port (*a*) by passing directly under the valve, as indicated by the red arrow (1) and also



passes over the valve, through the cavity (g) in the covering plate, and the passage (d) in the direction of the red arrows (2, 3, 4,) and enters the port (a) by that course.

5 The valve reaches the position shown in red outline when the piston has made about one-fifth of its stroke, and it will be understood, that as the space between the end of the valve, and the outer edge of the port, is

10 then equal to half the width of the steam way, and the space between the top edge of the valve, and the edge of the cavity (g) is of the same width, that the full width of opening is obtained.—The parts (f) and (e)

15 of the face of the valve being of no greater width, than the excess of width of the port, always give the full amount of opening at the port, provided there is opening enough at the top and bottom edges of the end of

20 the valve. The full width of opening continues during the retreating motion of the valve until the piston has arrived very near where the steam is shut off. The exhaust steam escapes from the steam way, D', di-

25 rectly into the cavity (b) in the direction of the arrow (5), and also through the passage (d') the cavity (g') and the opening (k) in the direction of the arrows 6 & 7.

The gain in time by this invention in

30 opening the steam and exhaust ports, will be exactly one-half, and in addition to this, the admission of steam to the back of the valve to balance it, is accomplished without other provision being made for that pur-

35 pose.

The safety valves, E, E, for preventing the bursting of the cylinder, are placed in the cavities (g, g') of the covering plate, C, and steam space is left in the steam chest

40 above the said plate. The valves may be of any known form capable of being lifted by the pressure of steam below them. The cavities (g, g') are always in communication through the passages (d, d') with their

45 respective steam ways, D, D', and during

the induction of the steam through the ports, are balanced by the steam above and below, but if the valve gear should give out, and the valve suddenly become stationary, leaving no opening for the escape of the steam

50 which must have been left at the time of its stoppage, in one end of the cylinder and one steam way, the compression of this steam by the continued motion of the piston, will cause the safety valve, E, in the cavity

55 (g) which is in communication with that steam way, to be lifted, and the steam will have free escape into the steam chest.

This invention can be applied to any steam engine, previously using the common

60 slide valve, all that is necessary being to enlarge the steam ports (d, d') to the extent represented, and construct a new valve, B, and apply a covering plate, C, as described. If there should not be sufficient

65 height in the old steam chest, to receive the valve and covering plate, a new one may be made at little expense compared with the advantages to be derived. The same eccentric, valve gear &c. are all applicable to the

70 new valve.

What I claim as my invention and desire to secure by Letters Patent is,

1. The valve B, constructed as described in combination with the cavities (g, g') in

75 the covering plate and the enlargement of the steam parts (a, a') substantially as and for the purpose herein set forth.

2. In combination with the cavities (g, g') in the covering plate, C, and the passages

80 (d, d') in the valve, I claim the safety valves E, E, placed on the top plate as described, for the purpose of allowing the steam to escape from the cylinder, into the steam chest, when the pressure in the former

85 exceeds that in the latter.

JOHN GLEASON.

Witnesses:

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HOMER RUGGLES.