

(No Model.)

2 Sheets—Sheet 1.

J. H. WHEAT.
STEAM ENGINE VALVE.

No. 486,148.

Patented Nov. 15, 1892.

Fig 1

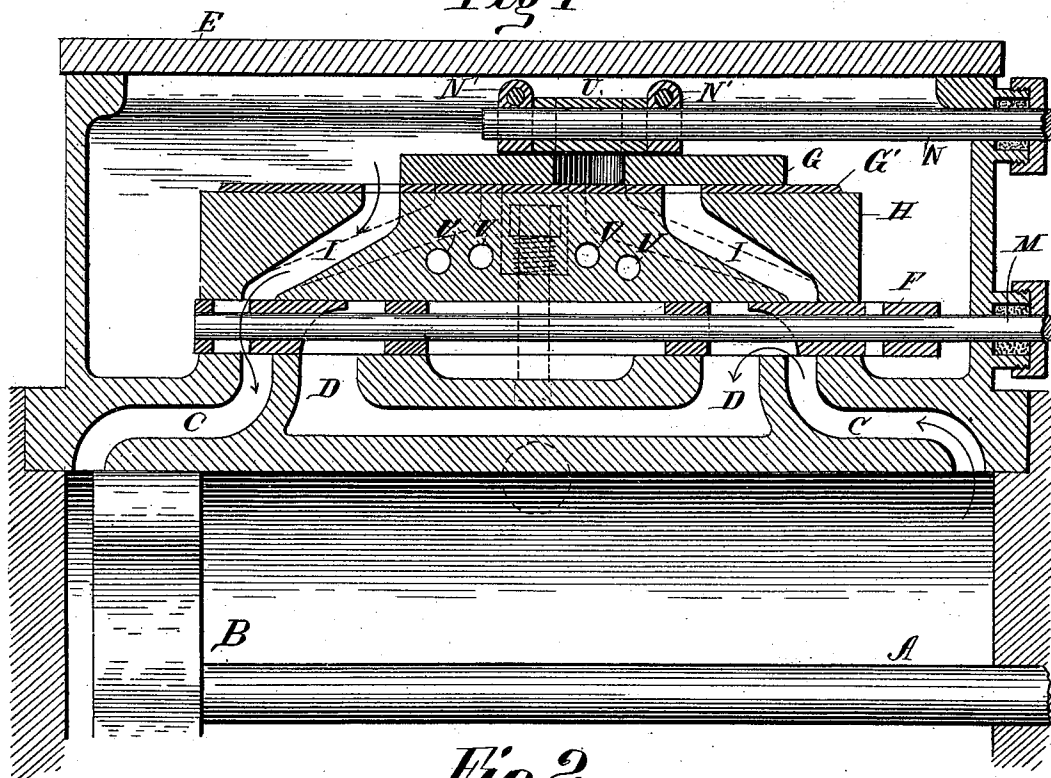
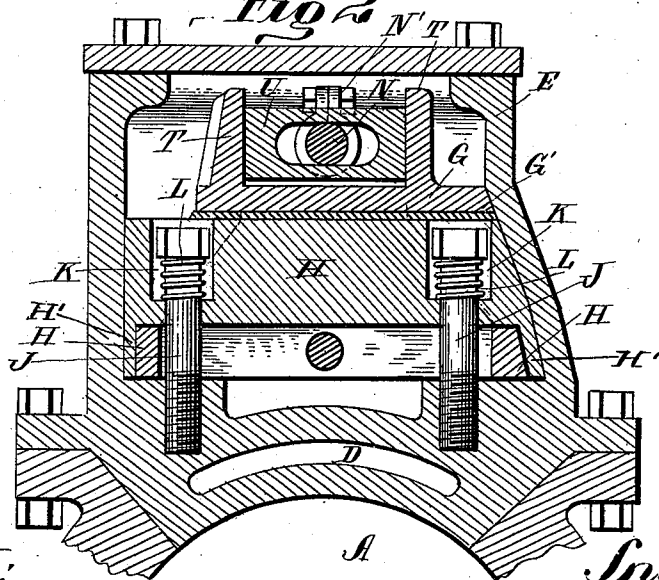


Fig 2



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Inventor;
James H. Wheat
per
Attys.

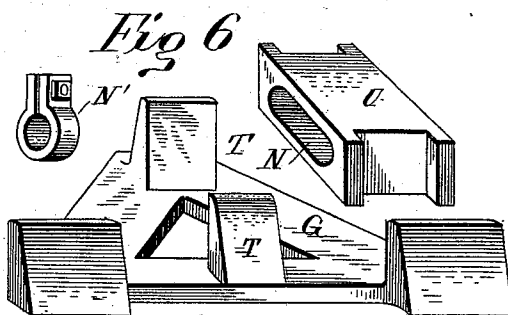
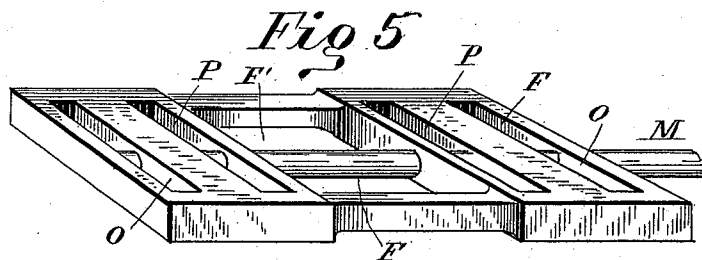
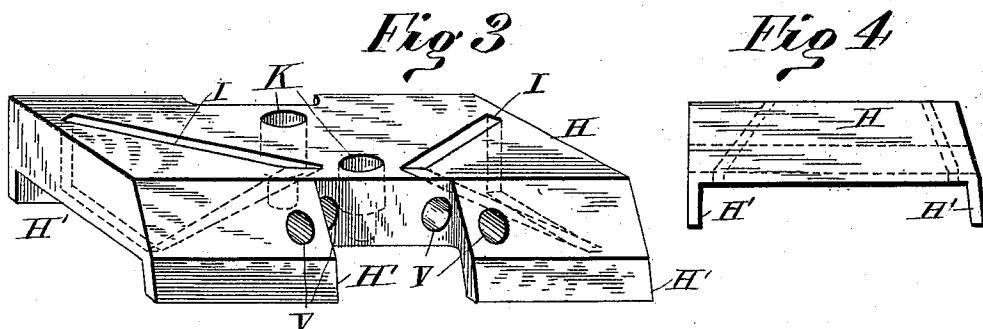
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STEAM ENGINE VALVE.

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Attest:
C. C. Burdine
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UNITED STATES PATENT OFFICE.

JAMES H. WHEAT, OF DAYTON, OHIO.

STEAM-ENGINE VALVE.

SPECIFICATION forming part of Letters Patent No. 486,148, dated November 15, 1892.

Application filed January 4, 1892. Serial No. 416,975. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. WHEAT, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Steam-Engine Valves; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains 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.

My invention has special reference to that class of slide-valves in which a relief-plate is used to reduce the friction and wear caused by down pressure of steam.

The object sought to be attained is to provide means which will more effectively relieve the main slide or cut-off valve, and thereby reduce wear, friction, and breakage.

A further object of my invention is to construct the mechanism so that the parts will be less liable to disarrangement when subjected to the usual jar and strain caused by reaction of steam in the steam-chest, and a still further object is to compensate for unequal contraction and expansion due to the effects of the sudden application of steam to the exterior only of the relief-plate, which unequal expansion and contraction acts as a serious obstacle to a smooth, true, and perfect movement at the beginning of the operation of the mechanism, soon causing the parts to become loose and defective. These several and important objects are attained by the peculiar construction of the relief-plate and its auxiliary or co-operating parts, all of which will be more fully described hereinafter, and pointed out in the claims.

Figure 1 represents a longitudinal section of a steam-engine chest and cylinder supplied with my improvements; Fig. 2, a cross-section thereof. Figs. 3 and 4 are detail perspective views of the relief-plate. Fig. 5 is a perspective view of the main valve. Fig. 6 is a detail view of the supplemental or cut-off valve and its attachments.

The reference-letter A denotes a steam-en-

gine cylinder, and B the piston, both of which are of ordinary construction.

C and D represent, respectively, the inlet and exhaust ports of the aforesaid cylinder, which, as usual, communicate with the valve or steam chest E. Valves F and G, located in this chest, work on either side of the relief-plate H through the medium of their actuating rods or stems *m* and *n*. Valve F, being the main valve, works over the ports C and D and is partially embraced by the relief-plate, whose overlapping sides H' are received by the main valve-seat on both sides of the ports, thus making it impossible for any steam to enter the ports except that which is admitted through the ports I in the relief-plate. This, however, will be more fully described later. The relief-plate is further held in adjustment by the cap-bolts J, which extend through the same and into the cylinder, recesses or pockets K being provided for the head of the bolt and the coil-spring L, which spring insures a firm but yielding contact between the valve F and valve-seat. These bolts are preferably two in number and pass through the main valve F at F', which will be clearly seen in Fig. 5. This valve, in addition to the large recess F' for the reception of the bolts J, is provided with the inlet and exhaust ports O and P, which register with the ports C and D of the cylinder.

Ports I are formed in the relief-plate and are of the same construction shown in my prior patent, No. 436,709, granted November 4, 1890. This form being old and well known to the art does not require a detail description. These ports are commanded by the cut-off valve G, which is substantially V-shaped, conforming to the shape of the aforesaid plate and is seated at G' on the relief-plate H. Lugs or projections T are formed on the upper side of the valve G, between which the block U is situated, having a hole or recess for the reception of the valve-stem N, which is held adjustable therein by means of the clamp-nuts N'.

In order to avoid any unequal expansion of the relief-plate caused by the application of steam to its exterior surface only, I form pas-

sages V therein, through which the steam is adapted to circulate. Thus it is evident that when the steam is admitted into the valve-chamber it immediately reaches all the parts of the valve mechanism, whereby an unequal expansion of the parts, which is so injurious to valves of this class, is avoided. When the steam is admitted into the valve-chest, the valves co-operate in such a manner as to allow the steam to pass, when going into the cylinder, through the ports I, O, and C and when going from the cylinder to the exhaust through ports C, P, and D, as shown by arrows in the drawings. The ports P of the main valve F are used exclusively for the exhaust-steam, while the ports O are used likewise for the fresh steam. The office of the relief-plate is to take the pressure of the steam off the main valve, which would in a short time (especially in high-pressure engines, now rapidly coming into use) render the valve practically useless, as experience has demonstrated.

Heretofore a further disadvantage of valve mechanism of this class has been due to the unequal expansion of the parts, for reasons before mentioned. This defect is entirely overcome by forming steam-circulation passages in the more compact or solid parts of the relief-plate. In the present case they are only formed in the relief-plate, but may be applied to any part of the valve with equally good results.

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

1. A steam-engine valve, in combination with the herein-described relief-plate having lateral steam-passages formed therein for the circulation of the steam, as set forth.

2. A steam-engine valve, in combination with inlet and exhaust ports, a main valve having a seat upon said ports, a relief-plate partially embracing said main valve, ports formed in the relief-plate and registering with the inlet-ports in the main valve, a cut-off valve having a seat upon the relief-plate and commanding the aforesaid ports therein, one or more recesses formed in the relief-plate for the reception of a corresponding number of spring-actuated cap-bolts, serving to hold the relief-plate in adjustment, and a

series of steam-circulation passages located in the relief-plate, in the manner and for the purpose substantially as described.

3. In a steam-engine valve, the combination, with a normally-stationary relief-plate, of main and cut-off valves working therewith, one or more bolts passing through and arranged to hold the relief-plate in place, and a spring operating in conjunction with the relief-plate to hold the latter yieldingly on its seat and allow it a limited movement away from the valve, as set forth.

4. In a steam-engine valve, the combination of a main valve working over the ports of the steam-cylinder, a stationary relief-plate fitting over the main valve, one or more cap-bolts passing through the relief-plate and main valve and having their ends secured in the steam-cylinder adjacent to the main valve-seat, springs operating with the cap-bolts in such a manner as to allow the relief-plate a limited upward movement only, and a cut-off valve located on top of the relief-plate and operating in unison with the main valve, substantially as described.

5. In a steam-engine valve, the combination of a stationary relief-plate, a main and cut-off valve working therewith, one or more cap-bolts passing through the relief-plate and main valve and having their ends secured in the steam-cylinder, and springs operating in conjunction with the relief-plate and cap-bolts, substantially as described.

6. The combination, with the valves of a steam-engine, of a relief-plate, substantially as described, said relief-plate being held normally immovable by means of bolts passing into the steam-cylinder.

7. In a steam-engine valve, the combination of a main valve, a relief-plate located thereon, a cut-off valve on the relief-plate, cap-bolts passing through the same and the main valve and adapted to hold the said relief-plate in place, and openings, such as F', in the main valve, through which the cap-bolts pass, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES H. WHEAT.

Witnesses:

CHAS. A. WALTIRE,
JOHN H. MEYER.