J. J. JONES.

THROTTLE VALVE MECHANISM FOR LOCOMOTIVES.

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1,229,968.

Patented June 12, 1917.

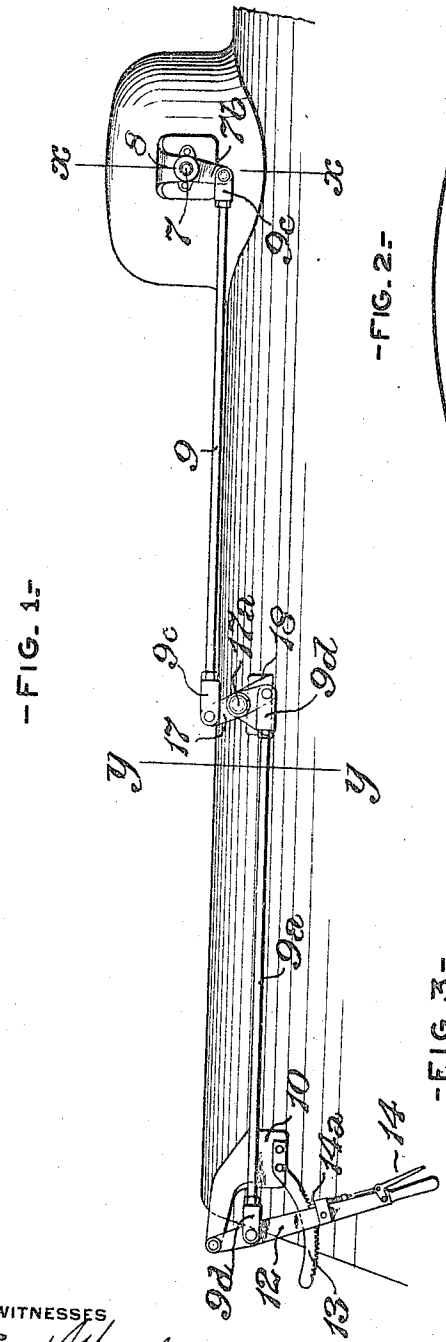


FIG. 1.

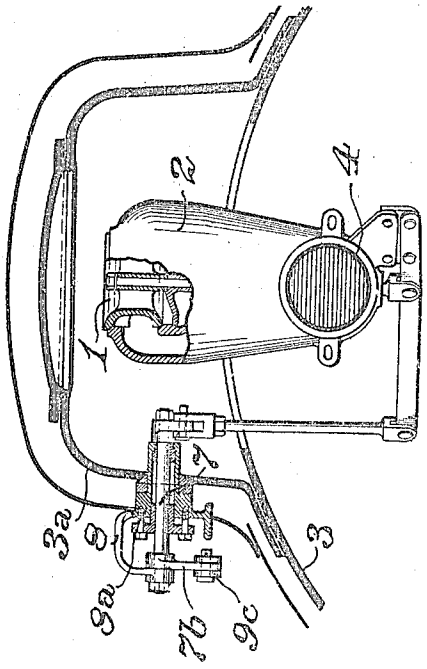


FIG. 2.

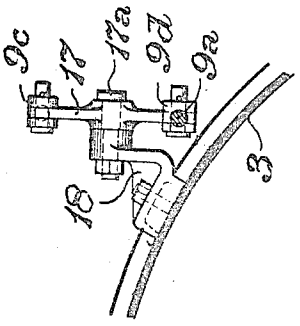


FIG. 3.

WITNESSES

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THROTTLE-VALVE MECHANISM FOR LOCOMOTIVES.

1,229,968. Specification of Letters Patent. Patented June 12, 1917.

Application filed February 19, 1917. Serial No. 149,632.

To all whom it may concern:

Be it known that I, JOSHUA J. JONES, of Schenectady, in the county of Schenectady and State of New York, have invented a certain new and useful Improvement in Throttle-Valve Mechanism for Locomotives, of which improvement the following is a specification.

My invention relates to throttle valve operating mechanism of the class or type long known in the art, in which the connections between the throttle shaft and throttle lever extend entirely outside of the boiler, and its object is to provide means whereby undue strain upon the connecting members, and accidental and undesired opening of the throttle valve, due, in each case, to unequal expansion and contraction of the exposed connecting members and of the boiler, respectively, when the temperature of the latter is materially raised or lowered, may be effectually prevented.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings: Figure 1 is a side view, in elevation, of the upper rear portion of a locomotive boiler, illustrating an application of my invention, and Figs. 2 and 3, vertical transverse sections, on an enlarged scale, on the lines *x x* and *y y*, respectively, of Fig. 1.

In throttle valve operating mechanism of the class to which my invention relates, particularly as applied in large locomotive boilers of the present standard types, a considerable distance ordinarily intervenes between the throttle valve dome and the throttle lever, which is supported at or near the back head of the boiler, and the throttle rod, which leads, externally to the boiler, from the throttle lever in the cab to the throttle valve dome, being exposed, throughout this distance, to the atmosphere, its expansion and contraction, under variations of atmospheric temperature, are materially less than those of the boiler, between its condition when under steam and when cooled to the temperature of the atmosphere after the fire has been drawn. As a result of this difference in expansion and contraction, it has been found, in practice, that the expansion of the boiler, when heated, is sufficiently greater than that of the throttle rod, to cause the throttle valve to be accidentally opened, thereby causing the unintended and unexpected movement of the locomotive, from which material damage has resulted. Another objection which is encountered in operating mechanism of the type referred to, is the imposition of undue stress and buckling tendency on the parts, by reason of the greater degree of contraction of the boiler in cooling.

My invention, which is readily applicable in connection with any of the known forms of outside throttle valve operating mechanism, enables the objections above noted to be fully overcome, without involving complication or substantial expense of construction or maintenance.

In the practice of my invention, referring descriptively to the specific embodiment thereof which is herein exemplified, the throttle valve, 1, which may be of any suitable and preferred construction, is, as heretofore, seated in, and controls the passage of steam through, a vertical stand pipe, 2, which is supported in the dome, 3^a, of a locomotive boiler, 3, and is connected, at bottom, to a dry pipe or steam supply pipe, 4, leading to the engine cylinders. The throttle valve is raised and lowered, to admit steam to, and shut it off from, the dry pipe, by connections to a horizontal oscillatory throttle shaft, 7, journaled in a support, 8, secured to the outside of the dome, 3^a, and extending through a stuffing box, 8^a, therein.

The throttle shaft carries, on its outer end, an arm, 7^b, which is coupled, by a throttle rod, comprising two connected sections, 9, 9^a, to a throttle lever, 12, pivotally connected to a support or stand, 10, secured to the boiler, in such location within the cab of the locomotive as may render the throttle lever conveniently operable by the engineer. The throttle lever swings over a segment, 13, secured to the support, and is maintained in any adjusted position thereon, by the engagement of a latch, 14^a, actuated by a latch handle, 14, pivoted to the throttle lever, with one of a plurality of teeth formed on the segment, 13, in the ordinary manner.

The two sections, 9, 9^a, of the throttle rod, are connected, one to the other, by being coupled to the opposite arms of a double armed compensating lever, 17, fixed on a fulcrum pin, 17^a, which is journaled in a fulcrum bracket, 18, secured to the boiler intermediate the throttle shaft and throttle lever, the pivotal connections of the throttle rod sections to the throttle shaft, compensating lever, and throttle lever, being fitted in

jaws, 9^c, 9^c, on the section, 9, and 9^d, 9^d, on the section, 9^a, respectively, in the usual manner. The pivotal axis of the compensating lever is preferably located in a vertical plane midway between the vertical planes of the throttle shaft and of the throttle lever pivot, in which case, the sections, 9, 9^a, of the throttle rod, would be made of equal length, but if located in front or in rear of such midway position, so that the rod sections are of unequal length, the arms of the compensating lever should be of relatively unequal lengths.

In the operation of a mechanism constructed substantially as above described, the throttle valve will be seated or unseated, as desired, by appropriate movements of the throttle lever, in one or the other direction, in the usual manner. It will, however, be seen that contraction or expansion of the boiler, under variations of temperature, will not affect the relation of the connected throttle rod sections to the throttle shaft and throttle lever, or the positions of said shaft and lever, or impose any strain whatever thereon or on the throttle rod, the only effect of the variations of length of the boiler being to impart a slight swinging movement of the compensating lever about the axis of its fulcrum pin, whereby the operative length of the throttle rod will be automatically increased and diminished, in correspondence with the variation of distance between the throttle shaft and throttle lever, resultant upon expansion or contraction of the boiler. Such increase and diminution of the operative length of the throttle rod is, in each case, positive and in invariable relation to the variation of distance between the throttle shaft and throttle lever, by reason of all the connections between said members being positive.

I claim as my invention and desire to secure by Letters Patent:

1. The combination, with a locomotive boiler, of an outside operated throttle valve; a throttle lever; and operating connections coupled positively to said throttle valve, to said throttle lever, and to each other, said connections including automatically operable means for compensating variation of boiler length under expansion and contraction.

2. The combination, with a locomotive boiler, of an outside operated throttle valve; a throttle lever; and operating connections coupled positively to said throttle valve, to said throttle lever, and to each other, said connections including automatically operable means for increasing and diminishing their operative length in accordance with variations of boiler length under expansion and contraction.

3. The combination, with a locomotive boiler, of an outside operated throttle valve; a throttle lever; longitudinally extending connections coupled to said throttle valve and to said throttle lever; and a pivotally mounted compensating lever, having oppositely extending arms coupled to said connections.

4. The combination, with a locomotive boiler, of an outside operated throttle valve; a throttle lever; a throttle rod section coupled to the throttle valve; a throttle rod section coupled to the throttle lever; and a pivotally mounted compensating lever, having oppositely extending arms, each coupled to one of the throttle rod sections.

5. The combination, with a locomotive boiler, of an outside operated throttle valve; a throttle lever; a fulcrum bracket fixed to the boiler, intermediate the throttle valve and throttle lever; a double armed compensating lever journaled in said fulcrum bracket; a throttle rod section coupling one of the arms of said lever to the throttle valve; and a throttle rod section coupling the opposite arm of said lever to the throttle lever.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."