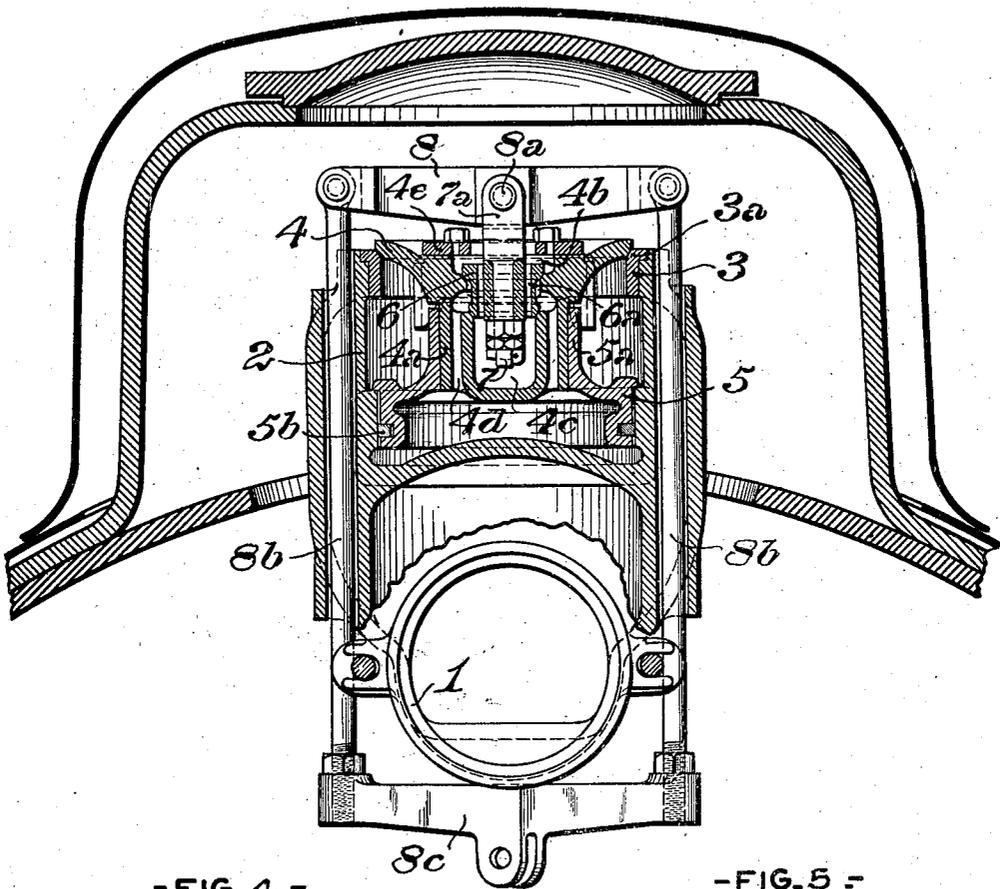


H. S. VINCENT.
 THROTTLE VALVE.
 APPLICATION FILED SEPT. 26, 1919.

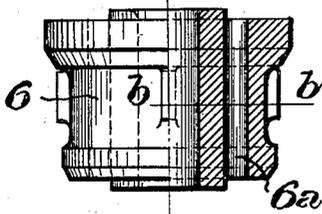
1,352,772.

Patented Sept. 14, 1920.
 2 SHEETS—SHEET 1.

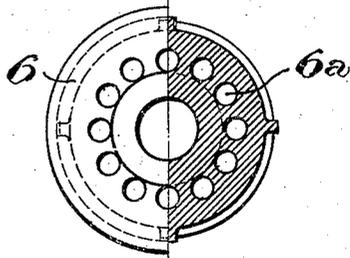
-FIG. 1-



-FIG. 4-



-FIG. 5-



WITNESSES
Edmund Wright
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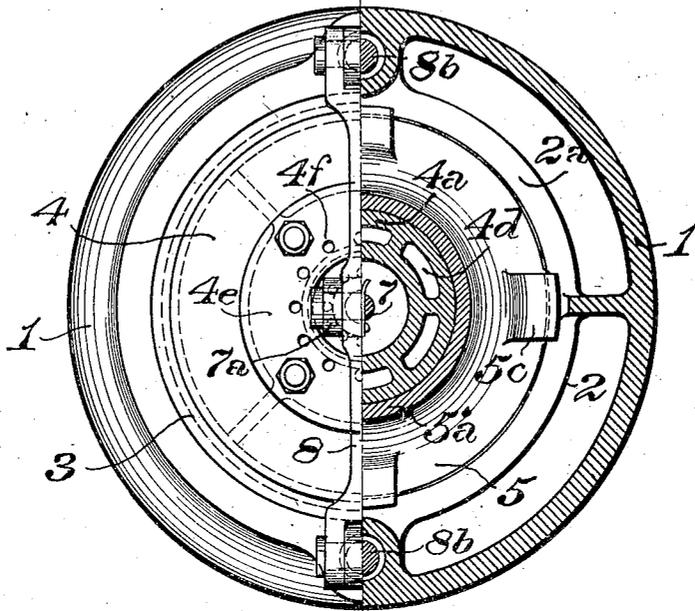
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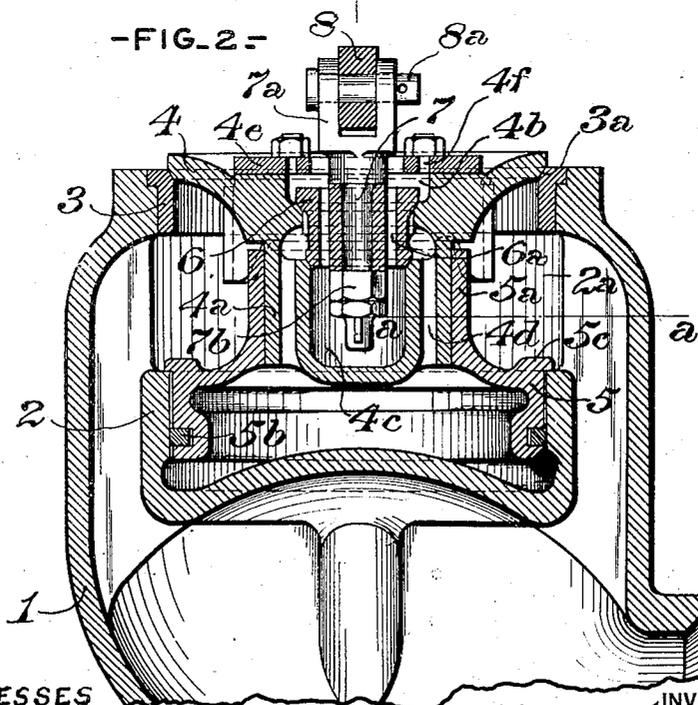
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2 SHEETS—SHEET 2.

-FIG. 3-



-FIG. 2-



WITNESSES

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UNITED STATES PATENT OFFICE.

HARRY S. VINCENT, OF RIDGEWOOD, NEW JERSEY.

THROTTLE-VALVE.

1,352,772.

Specification of Letters Patent. Patented Sept. 14, 1920.

Application filed September 26, 1919. Serial No. 326,626.

To all whom it may concern:

Be it known that I, HARRY S. VINCENT, of Ridgewood, in the county of Bergen and State of New Jersey, have invented a certain new and useful Improvement in Throttle-Valves, of which improvement the following is a specification.

My invention relates to single seated throttle valves of the general class or type in which means are provided for establishing equilibrium of the pressures on the opposite sides of the valve, preliminary to, and for facilitating, the unseating thereof, whenever desired. The object of my invention is to enable the throttle valve to be lifted from its seat much more quickly than has heretofore been practicable, by materially increasing the delivery area past the preliminary or pilot valve, without any increase in the lift of said valve or the power required to raise it.

The improvement claimed is hereinafter fully set forth:

In throttle valve structures of the type above referred to, the pilot valve has heretofore had only a single seat, and as, under existing conditions, it is not practicable to make any substantial increase in its diameter or lift, it has been developed, in practice, that an appreciable time is required to equalize the pressures below the balancing and above the throttle valve, thereby involving corresponding slowness in unseating the latter. My present invention applies a pilot valve of the double seated type, the operation of which, in connection with the other members of the valve structure, eliminates the delay in operation above noted.

In the accompanying drawings: Figure 1 is a vertical central section through the steam dome of a locomotive boiler, and through a throttle valve embodying my invention: Fig. 2, a similar section, on a larger scale, taken at substantially a right angle to Fig. 1; Fig. 3, a view, the left hand half of which is a plan of the throttle valve, and the right hand half, a horizontal section, on the line *a a* of Fig. 2; Fig. 4, a view, on a further enlarged scale, half in side elevation and half in vertical central section, of the pilot valve; and, Fig. 5, a view, half in plan, and half in horizontal section on the line *b b* of Fig. 4, of the same.

In the practice of my invention, referring descriptively to the specific embodiment thereof which is herein exemplified, I form,

at the upper end of the stand pipe, 1, through which steam is supplied from the boiler to the dry pipe, and thence to the engine cylinder or cylinders, a casing, 2, the interior of which constitutes a balancing or equalizing chamber, said casing being open at its top and closed at its bottom, and communicating, intermediately, with the interior of the stand pipe, by circumferential passages, 2^a. A seat ring, 3, is fitted in the open top of the casing, and a tapered or conical valve seat, 3^a, is formed on the inner side of said ring, at its top.

A throttle valve, 4, of the single seated poppet type, is adapted to be lifted and lowered from and to the valve seat, 3^a, and to thereby control the admission of steam from the boiler to the stand pipe. A sleeve or tubular extension, 4^a, depending from the lower side of the throttle valve, fits truly in a sleeve member, 5^a, formed on the upper side of a balancing piston, 5, which is fitted in the lower portion of the casing, 2, being made tight therein by a suitable packing ring, 5^b. The downward traverse of the balancing piston is limited by stop lugs, 5^c, on its top, and its upward traverse, independently of the throttle valve, is limited by the contact of the upper end of its sleeve, 5^a, with said valve. A central passage, 4^b, is formed in the main body of the throttle valve, below which a central chamber, 4^c, open at top and closed at bottom, is formed integral with the throttle valve sleeve, 4^a. Continuously open communication between the space within the valve surrounding the lower end of its central passage, 4^b, and the space within the casing below the balancing piston, 5, is established by a plurality of segmental passages, 4^d, extending around the chamber, 4^c.

The central passage, 4^b, of the throttle valve, is controlled by a pilot valve, 6, of the double poppet type, having upper and lower end seating faces, the seat of the upper face of which is formed at the top of the passage 4^b, and that of the lower face at the top of the chamber, 4^c. The pilot valve is lifted from, and lowered to, its seats by an operating stem, 7, having a jaw, 7^a, on its upper end, which is coupled by a pin, 8^a, to an upper cross head or yoke, 8, and is connected to the lower end of the stem by nuts, 7^b. The upper cross head, 8, is connected by vertical rods, 8^b, to a lower cross head, 8^c, adapted to be raised and lowered by any suitable known operating mechanism. Such

mechanism does not form part of my present invention, and, therefore, its specific construction is not herein set forth.

The preliminary traverse of the pilot valve, to such extent as to fully unseat it, is independent of the unseating traverse of the throttle valve, and is limited by a stop plate, 4^e, which is secured to the top of the throttle valve, and is spaced at such distance from the top of the pilot valve as to permit only the determined degree of preliminary traverse of the latter. Upon the termination of such preliminary traverse, the continued upward movement of the operating stem, 7, imparts corresponding unseating movement to the throttle valve, by reason of the engagement of the pilot valve with the stop plate, 4^e.

The throttle valve is balanced, and, therefore, rendered capable of easy manipulation, by the engineman, by the admission of steam to the space within the balancing chamber of the casing, 2, below the balancing piston, 5, thereby instituting equilibrium of the pressures acting on opposite sides of the throttle valve, this admission of steam being effected by a preliminary traverse of the pilot valve above described, through the continuously open passages, 4^d, upon the unseating of the pilot valve. The pilot valve is itself balanced by the admission of steam to its lower side through a plurality of continuously open passages, 6^a, formed in it, around the operating stem, 7, the combined transverse area of said passages being substantially equal to the area between the lower end of the valve and its seat, when at its maximum lift. Steam is admitted to the space between the faces of the pilot valve, when said valve is unseated, through a plurality of passages, 4^f, formed in the stop plate 4^e, the combined transverse area of which is substantially equal to that of the space around the pilot valve, when said valve is lifted through its full preliminary traverse.

It will be seen that by reason of the increased area for the admission of steam, which is obtained by the provision of the double seated pilot valve, the throttle valve may be unseated, whenever required, much more promptly than is practicable in constructions heretofore in practice.

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

1. The combination of a steam supply pipe; a single seated poppet throttle valve controlling said pipe; a substantially balanced poppet pilot valve, having opposite end faces, each fitting a seat in said throttle valve, said pilot valve being movable rela-

tively to the throttle valve; and means for successively unseating the pilot valve and the throttle valve.

2. The combination of a steam supply pipe; a single seated poppet throttle valve controlling said pipe; a poppet pilot valve having upper and lower faces, each fitting a seat in said throttle valve; said pilot valve being movable relatively to the throttle valve; means for substantially balancing said pilot valve; and means for successively unseating the pilot valve and the throttle valve.

3. The combination of a steam supply pipe; a single seated poppet throttle valve controlling said pipe, and having a central steam passage; a poppet pilot valve, having upper and lower faces, each fitting a seat in said throttle valve, and controlling the central passage thereof; continuously open balancing passages extending through the pilot valve; a balancing piston; conduits establishing communication between said central passage and the lower side of the balancing piston; and means for successively unseating the pilot valve and the throttle valve.

4. The combination of a steam supply pipe; a single seated poppet throttle valve controlling said pipe, and having a central steam passage and a sleeve depending below said passage; a substantially balanced poppet pilot valve, having upper and lower faces, each fitting a seat in said throttle valve, and controlling the central passage thereof; a balancing piston, having a sleeve fitting the sleeve of the throttle valve, and a plurality of conduits in said throttle valve sleeve establishing communication between the lower side of the balancing piston and the central passage of the throttle valve; and means for successively unseating the pilot valve and the throttle valve.

5. The combination of a steam supply pipe; a single seated poppet throttle valve controlling said pipe, and having a central steam passage; a substantially balanced poppet pilot valve, having upper and lower faces, each fitting a seat in said throttle valve, and controlling the central passage thereof; a balancing piston; conduits establishing communication between said central passage and the lower side of the balancing piston; an operating stem connected to the pilot valve; a stop plate fixed to the throttle valve, in position to be contacted by the pilot valve when fully unseated; and means for actuating the operating stem.

HARRY S. VINCENT.

Witnesses:

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C. MUNSON.