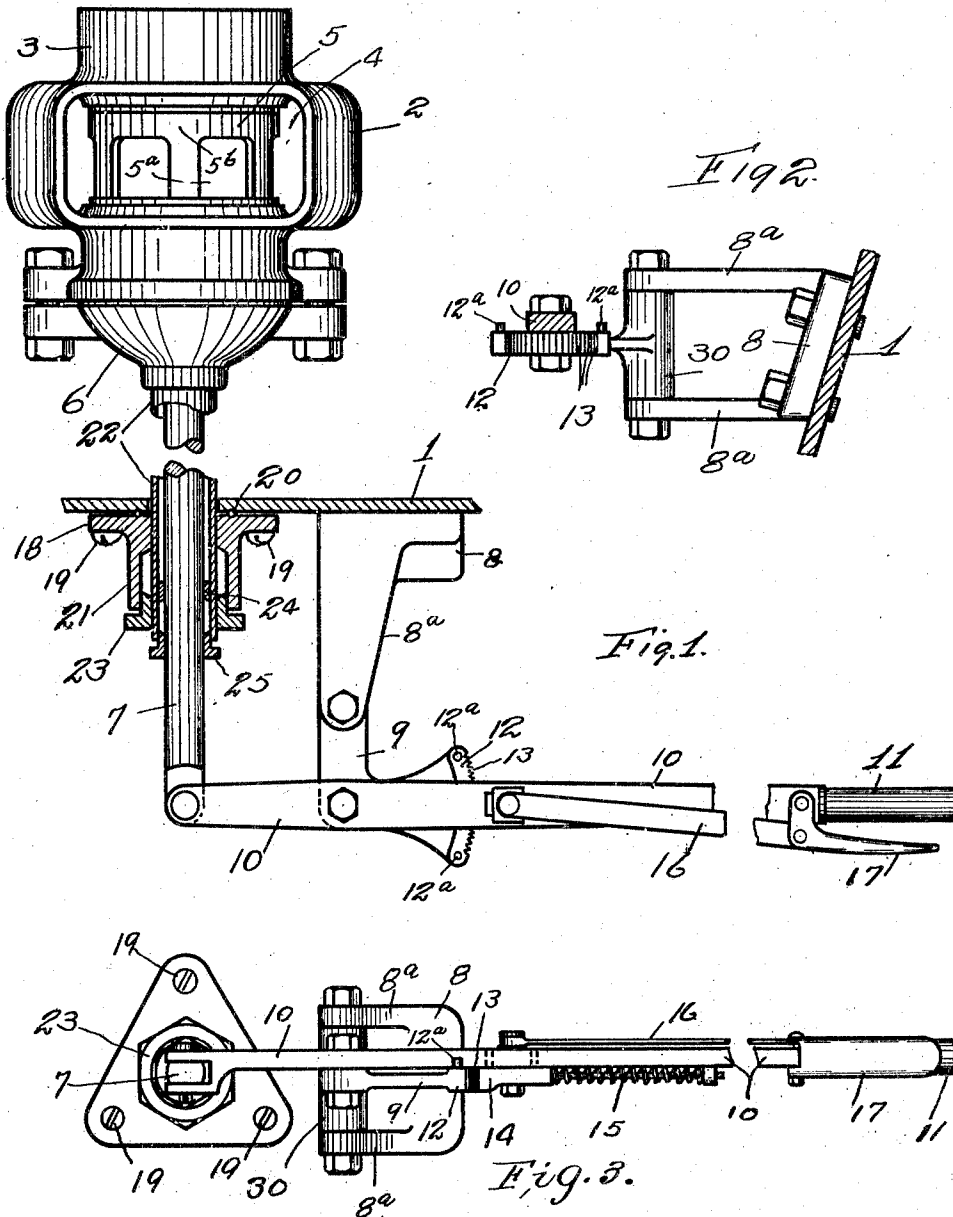


O. W. YOUNG.
THROTTLE VALVE CONTROL MECHANISM.
APPLICATION FILED JAN. 16, 1915.

1,249,877.

Patented Dec. 11, 1917.



WITNESSES:

Reverend S. Rice,
W. H. Clouston

INVENTOR.

Otis W. Young,
BY *Parke & Carter*

ATTORNEYS.

UNITED STATES PATENT OFFICE.

OTIS W. YOUNG, OF CHICAGO, ILLINOIS, ASSIGNOR TO PYLE-NATIONAL ELECTRIC HEADLIGHT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

THROTTLE-VALVE-CONTROL MECHANISM.

1,249,877.

Specification of Letters Patent.

Patented Dec. 11, 1917.

Application filed January 16, 1915. Serial No. 2,566.

To all whom it may concern:

Be it known that I, OTIS W. YOUNG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Throttle-Valve-Control Mechanism, of which the following is a specification.

In all steam engineering practice and particularly locomotive steam engineering practice the throttle valve is of the utmost importance. It is necessary that it respond at once to the manipulation of the engineer, that it remain tight, that it be easily handled and manipulated, that it be adapted to close when released and that it remain steam tight and continue to operate smoothly and easily under all different surface conditions and different degrees of temperature and resultant change in boiler and accompanying parts and one object, therefore, of my invention is to provide a throttle valve located within the boiler in such manner that it may continue to operate independent of changes in the temperature and resultant changes in size or shape of the boiler. Another object of my invention is to provide a control gear which is convenient and easily arranged and supported and which will reduce to a minimum all undue strain and stress of the throttle valve stem and kindred parts. Another object is to provide such a gear capable of accurate adjustment and operation. Other objects of my invention will develop in the specification.

My invention relates to improvements in gears for throttle valves and the like and while it is primarily destined for use in connection with a direct acting reciprocating throttle valve diagrammatically suggested herewith it is directly obvious that it is equally well adapted for use for any number of different purposes or in connection with different types of valves. The invention, therefore, is illustrated more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is a diagrammatic plan view of the valve and valve gear showing the boiler and packing sleeves and collars in section;

Fig. 2 is a side elevation of the valve control bracket support with the control lever in section;

Fig. 3 is a side elevation of a valve lever bracket and kindred parts showing the valve

stem in end elevation with the boiler itself omitted.

Like parts are indicated by like numerals throughout the several figures.

1 is the side wall of a locomotive or other steam boiler. 2 is the valve housing leading from it. At one side is the discharge pipe coupling 3 and projecting from it at the top is the intake pipe 4. The housing contains slidably mounted therein a valve sleeve 5 ported as at 5^a to control the passage of steam through the intake pipe 4 and the body of the housing 2 out through the exhaust pipe connection 3. When the valve sleeve is moved toward the boiler wall away from the exhaust end the closed portion 5^b will take the place of the ports and no steam can pass through. When the valve sleeve is moved in the opposite direction the ports will be opened wider and wider to permit increased passage of the steam. 6 is a removable cover plate covering the end of the valve housing removed from the discharge. 7 is a valve stem passing through the centrally apertured cover plate and is attached to one end of the valve 5 by any suitable means not here shown and projects out beyond the boiler wall. 8 is a bracket on the boiler and 9 is a bell crank pivoted at one end upon the bracket. 10 is a lever pivoted on the bell crank 9 and in pivotal engagement at one end with the valve stem 7 having a control handle 11 at the other end. 12 is a quadrant or guide support formed on and carried by the free end of the bell crank lever having locking teeth 13 along one side in opposition to the lock member 14 on the lever 10. This lock member is thrust against said teeth by the spring 15 and may be withdrawn from them by the link 16 controlled by the hand lever 17 adjacent the handle 11. 18 is a plate apertured to register with an aperture in the boiler shell and held in position by means of the set screws 19 so that the packing ring 20 is compressed between it and the outside of the boiler shell to make a close joint between the plate and the boiler. 21 is a sleeve projecting outwardly from the plate 18. 22 is a packing tube rigidly attached at its inner end to the cover plate 6 and making a steam tight joint therewith and projecting out through the boiler wall plate 18 and beyond the end of the sleeve 21. 23 is a packing gland in the sleeve 21 surrounding the tube 22 to make

a steam tight slidable joint between the tube and the sleeve and boiler thus permitting movement of the valve housing and expansion and contraction of the tube with respect to the boiler all without disturbing the steam tightness of the joint between the boiler and the tube. It will be noted that the tube 22 surrounds the valve stem 7. Adjacent the outer end of the tube is located a packing ring or shell 24 and in the end is located the packing gland 25 and any other suitable means can be made to form a steam tight closure between the valve stem and the tube so as to permit free movement of the valve stem back and forth without interfering with the steam tightness of the joint between it and the tube and through it the boiler.

It will be evident that while I have shown in my drawings an operative device, still many changes might be made both in size, shape and arrangement of parts without departing from the spirit of my invention and I wish, therefore that my drawings be regarded as in a sense diagrammatic.

The bell crank lever 9 has at one end the sleeve 30 and this sleeve is held between the arms 8^a, 8^b of the bracket 8 and pivoted on them. The result of this is that the bell crank lever is free to rotate with respect to the bracket 8 about a vertical axis and in a horizontal plane but is held against any other movement and since the lever 10 rests on this bell crank arrangement it is obvious that that lever is properly guided and set and may be operated by the engineer without danger of bending or distortion of the valve stem and thus the need of any additional support for the lever is obviated and the bell crank, therefore, provides a combined lever support, lever fulcrum and locking quadrant.

The use and operation of my invention is as follows:—

The valve housing is suspended within the interior of the boiler and is subject to the pressure of the steam and also to the temperature conditions prevailing in the boiler. Both the housing, its supports and the boiler are subject to varying temperature conditions and all these vary in relative positions and it becomes necessary to provide means for controlling the valve within the housing from the outside without interfering with the shape, position and size changes caused by the temperature variations.

In the position shown in the drawings the valve is open and steam rushes in from the interior of the boiler into the valve housing at the top passing through the valve and discharges through the discharge pipe. The valve housing is under such circumstances substantially filled with steam at about boiler pressure. When the valve is closed the ports shown are withdrawn from reg-

ister with the intake pipe. It is evident that the outside or outer portion of the housing will be subjected to boiler pressure but the inside of the housing on the inside of the valve communicating therewith will be subjected to substantially no pressure. To prevent leakage of pressure along the joint between the valve housing and the piston rod it is necessary to provide some kind of friction or flexible packing. To prevent leakage of steam around the valve stem where it passes through the boiler wall it is necessary to provide a similar packing. Under ordinary circumstances there is then a packing gland inside the boiler between the valve stem and the valve housing, and another packing gland outside the boiler between the valve stem and the boiler and each of these glands is subjected at all times to the maximum boiler pressure.

In my invention I substitute for the gland inside the boiler in the wall of the valve housing a packing tube which is in fixed rigid steam tight relation with the housing and projects out through the boiler wall. This packing tube is large and is surrounded with a packing gland so that the tube may be free to slide with respect to the boiler under the influence of pressure and temperature variations and this gland which is large and which is subjected to very little movement is the only gland which is always exposed to the full boiler pressure. In the end of this tube I provide a smaller packing gland between it and the valve stem and this gland is outside of the boiler and it can be easily inspected and adjusted since when the valve is closed there is no steam pressure inside the packing tube and it is obvious that the valve stem is subjected to pressure at no time whatever and thus is protected and can easily be taken care of at all times.

The valve stem must be thrust forward to open the valve and when it has been opened and there is a pressure inside the valve housing, that pressure is unbalanced and always tends to yieldingly close the valve so that when the engineer lets go of valve operating mechanism the valve will automatically close. The controlling lever is pivoted at one end on the valve stem and at the other end on a floating fulcrum. It will be understood that the purpose of the bell crank lever which forms the floating fulcrum is to obviate the necessity of a linkage connection with the valve stem since the bell crank is free to swing. It will be further understood that when the lever is rotated it positively drives the valve and that the valve will stay at the exact position in which it is put because merely locking the quadrant on the bell crank lever in fixed position with respect to the controlling lever will prevent relative rotation of the lever and quadrant

and thus movement of the valve stem. The bell crank lever, of course, being rigidly supported on the bracket thus furnishes a rigid and sufficiently strong support to keep the lever in the proper horizontal plane and to protect the valve stem against any undue stresses or strains.

I claim:—

1. The combination with a control lever for throttle valve stems and the like, of a pivotally mounted plate upon which it is pivoted at a point removed from its end, the pivotal axes being parallel, and means for holding the plate in a plane perpendicular to its pivotal axis.

2. The combination with a control lever for throttle valve stems and the like, of a pivotally mounted plate upon which it is pivoted at a point removed from its end, the pivotal axes being parallel, the lever being in slidable contact with a portion of the plate removed from its pivotal point on the plate.

3. The combination with a control lever for throttle valve stems and the like of a plate upon which it is pivoted at a point removed from its end, a bearing sleeve projecting from said plate at a point removed from its pivotal connection with the lever and supports between which such sleeve is pivoted on an axial line parallel with the pivoted axis of the lever.

4. The combination with a control lever for throttle valve stems and the like of a plate upon which it is pivoted at a point removed from its end, a bearing sleeve projecting from said plate at a point removed from its pivotal connection with the lever and supports between which such sleeve is pivoted on an axial line parallel with the pivoted axis of the lever, the lever being in slidable contact with a portion of the plate removed from its pivotal point on the plate.

5. The combination with a control lever for throttle valve stems and the like, of a pivotally mounted plate upon which it is pivoted at a point removed from its end,

the pivotal axes being parallel, and means for holding the plate in a plane perpendicular to its pivotal axis, comprising a quadrant carried by the plate adjacent the lever, a latch carried by the lever in engagement with the quadrant, and means mounted on the lever for operating the latch.

6. The combination with a control lever for throttle valve stems and the like, of a pivotally mounted plate upon which it is pivoted at a point removed from its end, the pivotal axes being parallel, the lever being in slidable contact with a portion of the plate removed from its pivotal point on the plate, a quadrant carried by the plate adjacent the lever, a latch carried by the lever in engagement with the quadrant, and means mounted on the lever for operating the latch.

7. The combination with a control lever for throttle valve stems and the like, of a bell crank lever, a pivoted connection between the control lever and the bell crank lever at its center, a guide support in engagement with the control lever on one end of the bell crank lever, the bell crank lever being pivoted at its other end and held in a plane parallel to the pivotal axis of the control lever.

8. The combination with a control lever for throttle valve stems and the like of a bell crank lever, a pivot connection between the control lever and the bell crank lever at its center, a guide support in engagement with the control lever on one end of the bell crank lever, the bell crank lever being pivoted at its other end and held in a plane parallel to the pivotal axis of the control lever, the lever being in slidable contact with a portion of the plate removed from its pivotal point on the plate.

In testimony whereof, I affix my signature in the presence of two witnesses this 11th day of January, 1915.

OTIS W. YOUNG.

Witnesses:

LAUREL M. DOREMUS,
BESSIE S. RICE.