Aug. 12, 1941. H. Y. SEIDEL ET AL 2,252,141

VALVE

Filed June 28, 1939

Fig. 1.

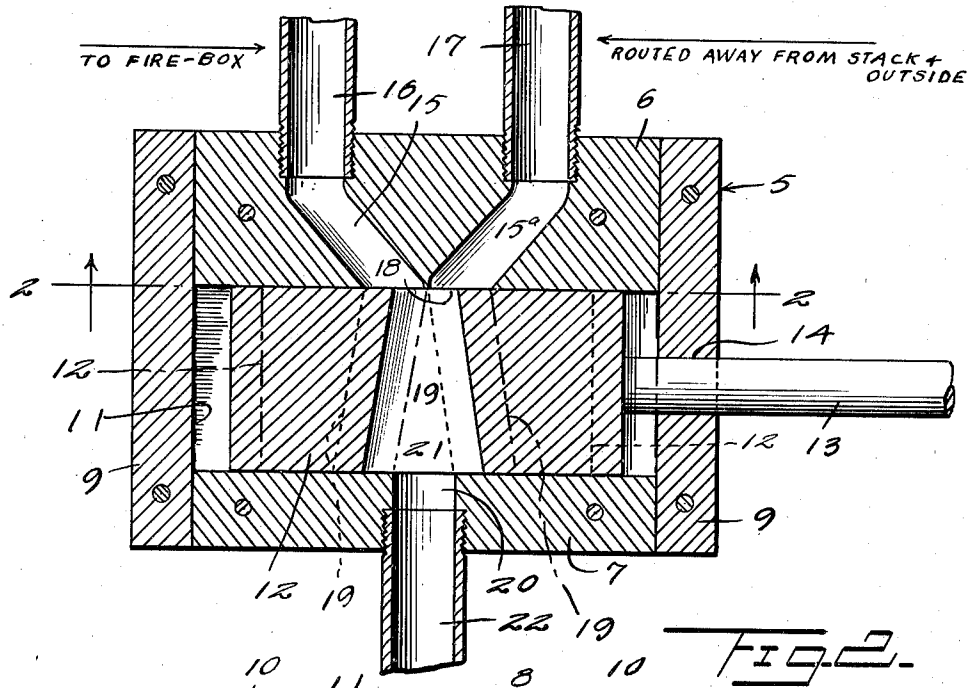


Fig. 2.

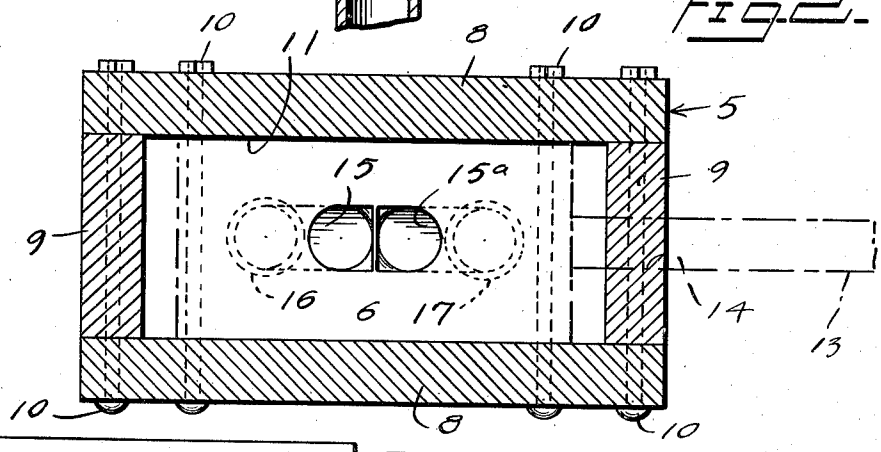
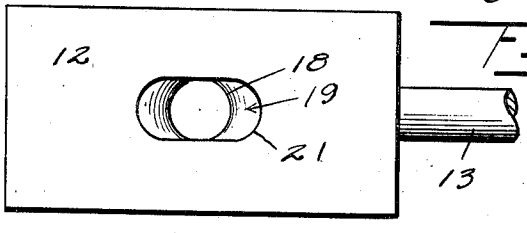


Fig. 3.



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WITNESS

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VALVE

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2 Claims. (Cl. 251—73)

Our invention relates to improvements in steam boilers and more particularly to draft control and spark eliminating devices therefor.

It has been a common practice, in locomotive boiler construction, to provide means for conducting the exhaust steam, discharged from the cylinders, through forced draft means in the smoke box and through the stack to create a draft through the boiler and thereby raise the temperature of the fire. In the construction heretofore commonly employed it frequently happens that the draft thus created is too strong and/or is produced at times when it is unnecessary and objectionable resulting in waste of fuel through unnecessarily rapid burning thereof, by the blowing of raw fuel through the stack, and avoidable deterioration of the boiler and especially the baffle plates which are subjected to burning and warping during the operation of the draft.

A primary object of our invention is to provide means for regulating the passage of exhaust steam through the forced draft device so as to effect economy in fuel consumption and decrease deterioration of the boiler structure.

Another object of the invention is to provide forced draft regulating means which will enable diminution of the discharge of sparks from the stack or outlet of a boiler.

A further object of the invention is the provision of valvular regulating means designed so that part or all of the exhaust steam from the cylinders can be selectively conducted so as to by-pass the smoke box or forced draft device.

A still further object of our invention is to provide regulating means whereby part of the exhaust steam may be conducted through the draft effecting means and part discharged to the atmosphere.

Another object of our invention is to provide a device of the above described character which is simple in construction, durable in use, efficient in operation, capable of being attached to boilers already in use without modifying the latter, and economical in manufacture.

Other objects and advantages will be apparent from the following description, appended claims and annexed drawing.

Referring to the drawing wherein like reference characters designate like parts throughout the several views:

Figure 1 is a vertical sectional view of our invention.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a plan view of the valve member looking in the direction towards the intake side thereof.

In practicing our invention, with reference to a preferred embodiment illustrated in the drawing, we provide a valve casing 5 constructed of a pair of plates 6 and 7 connected together in spaced relation by spaced pairs of side and end members 8 and 9 respectively. The side members 8 have transversely extending therethrough bolts 10 which secure the end members and plates to the side members and form a draft control unit sealed against leakage.

The inner faces of the side and end members cooperate with the opposed faces of the plates to define between the latter a valve chamber 11 slidably accommodating therein a valve member 12. The valve member 12 is provided on one end thereof with a valve stem 13 slidably extending through an aperture 14 formed in one of the end members 9 and which valve stem is adapted to be connected to remote means (not shown) for effecting operation thereof in a manner hereinafter more fully described.

The plate 6 is formed with a pair of outwardly diverging passages 15 and 15a, the upper ends of which terminate in parallel extending sections in which are threaded the ends of pipes 16 and 17 respectively. The pipe 16 is adapted to communicate with the smoke box of a boiler whereby steam exhausted from the pipe 16 creates a forced draft through the boiler and is discharged through the stack of the boiler.

The pipe 17 is adapted to extend without the boiler and communicate with the atmosphere for dissipating the exhaust steam. The inner ends of the passages 15 and 15a terminate adjacent each other for unitary and selective communication with the apex end 18 of a substantially funnel-shaped tapered bore 19 formed in the valve member 12.

The plate 7 is formed with a centrally disposed inlet passage 20 having an inner end for communication with the base end 21 of the bore of said valve member 12. The outer end of the passage 20 has threaded therein one end of an exhaust pipe line 22, the opposite end of which is adapted to be connected to exhaust outlets of the cylinders. The base end 21 of the bore 19 is of an elongated configuration and of a sufficient length to effect communication with the inner end of the passage 20 when the apex end 18 of the bore is disposed for communication with either or both of the passages 15 and 15a.

When steam is exhausted from the cylinders through the pipe line 22, the same is introduced

into either or both of the passages 15 and 15a depending upon the position of the valve member 12. When the valve member 12 is adjusted to position the bore 19 in sole communication with the passage 15 and the pipe 22, all of the exhaust steam will be discharged through the pipe 16 and create forced draft through the smoke box and whence it is exhausted into the stack. When the valve is adjusted to a position wherein the bore 19 effects sole communication between the passage 15a and pipe 22, the steam will be exhausted through the pipe 17 to the atmosphere thereby eliminating any forced draft in the smoke box. However, the valve member may be adjusted between the foregoing described positions to permit a desired amount of steam to be exhausted into the smoke-box for creating sufficient forced draft therein for maintaining the fire at a desired temperature.

In actual reduction to practice, our invention was used on the boiler of a Bucyrus-Erie Railroad type of steam shovel and effected a savings of approximately 33⅓% of fuel or coal consumed as compared with the operation of the same shovel under the same conditions and not equipped with our invention. The results of this operation lead us to believe that a greater economy in fuel may be effected upon application of our device to a locomotive type of boiler for the reason that the latter type is given to more frequent and longer periods of idling operations as compared to the first mentioned type.

Furthermore, experiments have shown that when our invention is used, sparks discharged through the stack of a boiler are of a size approximately that of grains of rice and due to this size are immediately extinguished when projected into the air about the stack thus eliminating fire hazard to extramural objects.

From the foregoing it will be apparent that we have provided a simple and efficient device for controlling the forced draft in boilers, thereby effecting an economy in fuel, increasing the life of the various parts of the boiler and appreciably decreasing the amount of sparks discharged from the stack owing to partly consumed fuel.

It is obvious that the invention is not confined to the herein described use therefor as it may be utilized for any purpose to which it is adaptable. It is therefore to be understood that the invention is not limited to the specific construction as illustrated and described, as the same is only illustrative of the principles of operation, which are capable of extended application in advance forms, and that the invention comprehends all construction within the scope of the appended claims.

What we claim is:

1. In a forced draft control device for locomotive boilers, a valve chamber having an inlet passage in one side and a pair of outlet passages in the opposite side, the said outlet passages disposed so that their inner ends are proximate while their outer ends diverge, and a valve mounted to reciprocate in the said chamber having a tapered passage operable to provide communication between the inlet passage and either of the outlet passages and partially with both of the said outlet passages.

2. In a forced draft control device for locomotive boilers, a valve chamber having an inlet passage in one wall thereof and a pair of outlet passages in the opposite wall, the said outlet passages disposed through the wall so that their inner ends are proximate as they communicate with the chamber and their outer ends arranged in spaced diverging relation, and a valve mounted to reciprocate in the chamber having a tapered passage therethrough formed so that the larger end registers with the inlet passage while the opposite reduced end is selectively adjustable to register with either or both of the outlet passages.

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