

July 21, 1931.

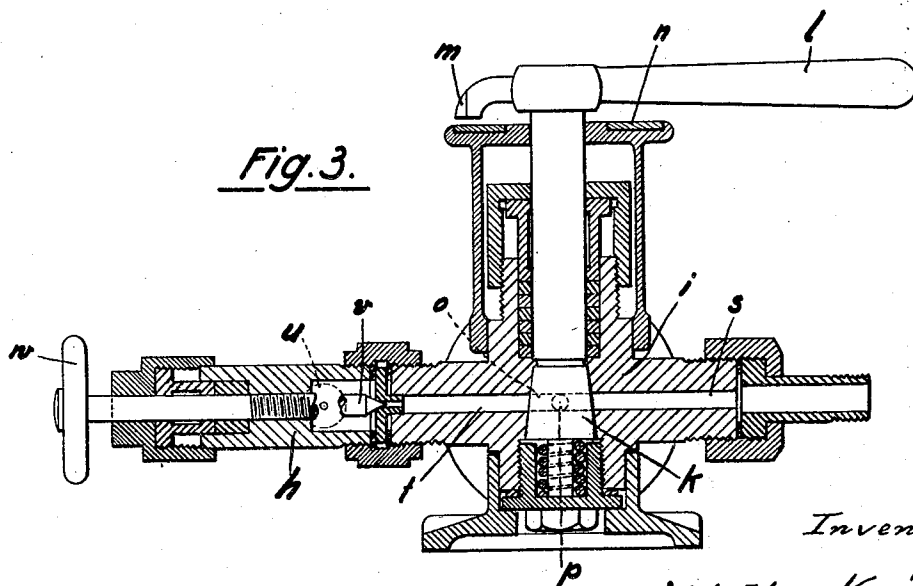
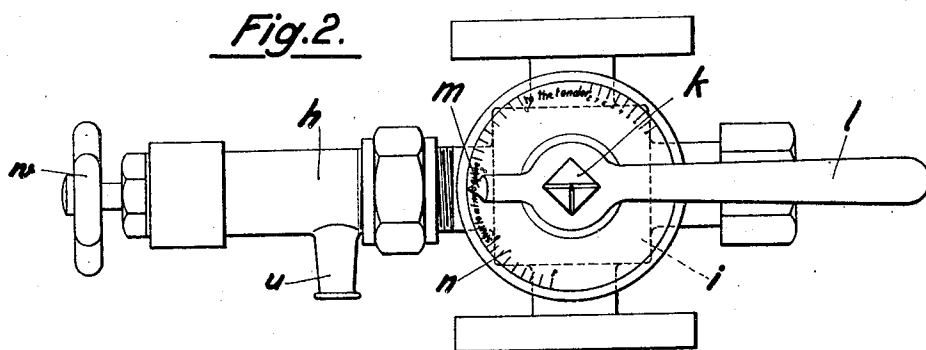
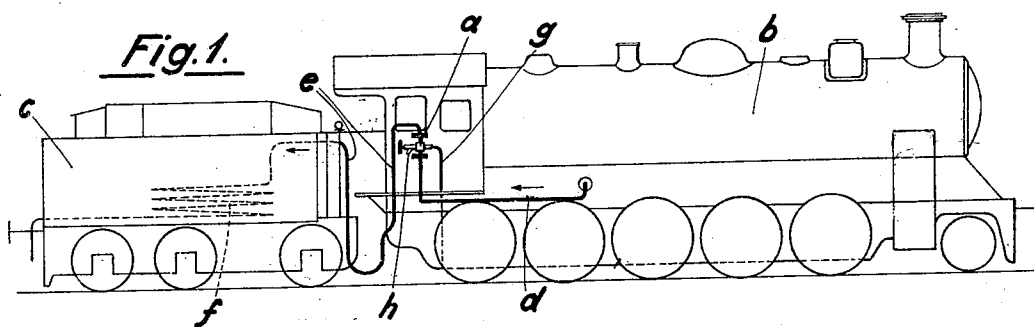
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1,815,151

REGULATING AND TEST COCK FOR BOILER PIPING

Filed Sept. 24, 1927

2 Sheets-Sheet 1



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Fig. 4.

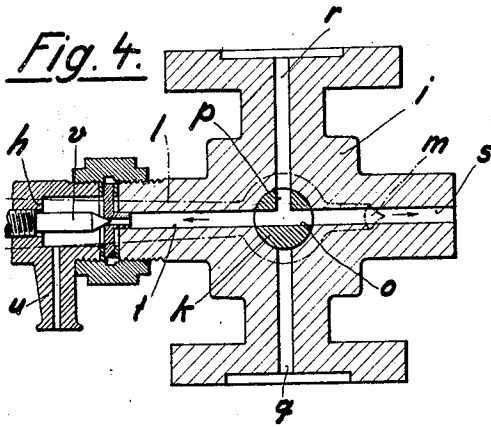


Fig. 5.

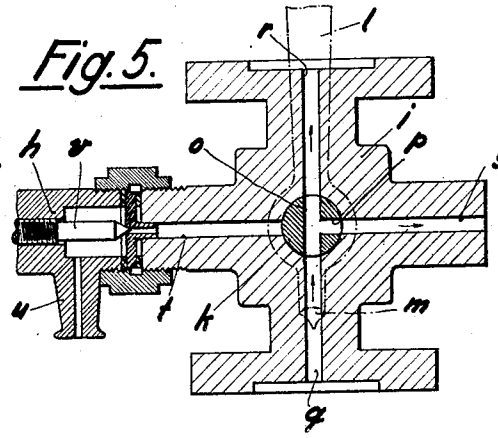


Fig. 6.

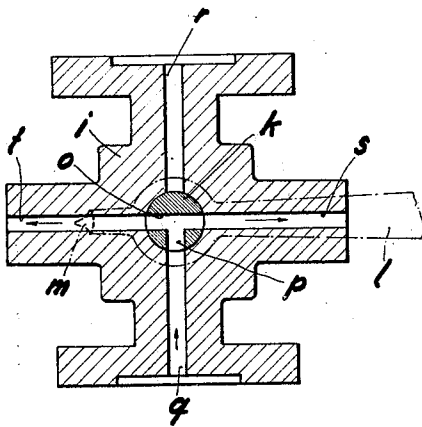
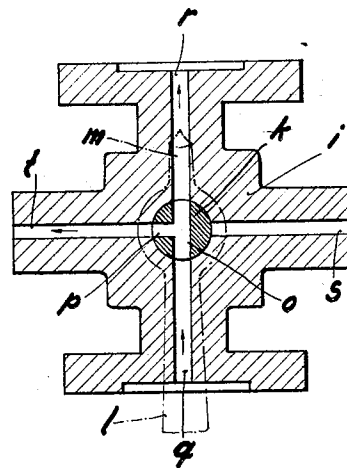


Fig. 7.



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UNITED STATES PATENT OFFICE

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REGULATING AND TEST COCK FOR BOILER PIPING

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For the purpose of regulating the flow of water drained or drawn off from boilers as for instance for the purpose of making the periodical water tests prescribed by law, or for the purpose of blowing through the piping for cleaning, or for the purpose of blowing off water which may have become too highly saturated with salts, it has up till now been customary to employ a number of separate cocks.

This use of several cocks however, presents the inherent disadvantage and danger, that due attention to one or the other of these cocks may be overlooked or may be neglected, a fact which under certain circumstances might bring about a breakdown of the boiler plant or at least be the cause of possible extensive and expensive damage. This danger however, is eliminated by means of the present invention, inasmuch as only one single cock is employed. This cock is however, so designed and provided with facilities for such connection that according to the position of the plug of the cock the following operations may be performed viz:—

The boiler water can flow from the boiler through the cock to a filtering apparatus, or to the tubes of a pre-heater or the prescribed extraction of samples of the boiler water for testing purposes can be made or again the cock can be used as a blow-off cock for emptying the sludge water from the boiler. With a view to achieving these results the usual cock plug or cone is formed with a T shaped passage and the casing or housing of the cock is formed with four channels opposite to one another, which communicate with the channels of the cock plugs according to its position.

By means of the cock forming the subject of the present invention, it is possible by simply turning the plug:—

(1) To open the direct flow and to close same, as well as to regulate it for any predetermined quantity of discharge.

(2) To take off samples of the boiler water for tests.

(3) To discharge or drain off into the atmosphere in any desired quantity the boiler

water that may have become saturated with salt.

In this way any danger to the working of the boiler is eliminated.

An example of the present invention is shown in the accompanying drawings in which:—

Fig. 1 represents diagrammatically the application of this cock on a steam locomotive.

Figs. 2 and 3 are respectively side elevation and axial horizontal section of the cock.

Figs. 4, 5, 6 and 7 are sectional views illustrating four different positions of the cock plug.

As seen from Fig. 1 the cock may be interpolated in the sludge piping between the boiler *b* of the locomotive and the water storage tank *c* on the tender. The pipe *d* leading from the boiler *b* to the cock *a* is connected to the sludge or mud collector of the boiler *b* or to the lowest point of said boiler. The discharge pipe *e* leads from the cock *a* to the tender, and flows through the water storage tank on the tender by means of convolutions of the tubes *f* and then into the atmosphere.

Another pipe *g* is also connected to the cock *a*, which enables the cock to communicate directly with the atmosphere, whereas the socket piece *h* enables samples of the boiler water to be drawn off for testing purposes.

The cock *a* itself consists of a cock casing *i* in which is rotatably seated a plug or cone *k* which can be turned by means of the handle *l*, this handle *l* terminates in an indicator hand *m* which indicates upon a dial *n* the different positions of the cone *k*. On this scale or dial the indications "To the tender", "Shut" and "To atmosphere", as well as sub-divisions are marked as is seen in Fig. 2.

The plug *k* of the cock is formed with a T shaped passage *o* and *p* and channels *q*, *r*, *s* and *t* are formed in opposite positions in the cock casing *i*, and these channels or ducts are in such a position, that according to the position occupied by the plug *k* three of them communicate with the passages *o*

and *p* of plug *k*. The channel *g* connects the cock with the pipe *d* leading from the boiler *b* of the locomotive, channel or opening *r* connects the pipe *e* leading to the water storage tank *c* on the tender. The channel or bore *s* connects with the discharge pipe *g* to the atmosphere, and channel *t* makes connection with the socket device for sampling the water.

This socket piece *h* is screwed on to the casing *i* and comprises a lateral mouth piece *u* which serves for the drawing off of samples of the boiler water. The discharge of the water from the channel or bore *t* is regulated by means of a needle valve which can be adjusted externally by means of a small hand wheel *w*.

For the purpose of discharging the sludge water of the boiler *b* into the water tank *c* the handle *l* is turned either upwardly as in Fig. 5 or downwardly as in Fig. 7. The hot water from the boiler then flows through the tube convolutions *f* and before being discharged into the atmosphere transfers its heat content or part of its heat content to the feed water in the storage tank.

In the position shown in Fig. 5 the base *p* in the cock plug connects with the discharge pipe *g* so that part of the highly saline boiler water can be discharged directly to the atmosphere. If it be required to draw off samples of the boiler water the cock plug *k* is turned by the handle *l* to the position shown in Fig. 7. When the cock is in the closed position as in Fig. 4 the connection with the boiler *b* is shut off, and the pipe *e*, and channels *r* and *t* are then drained to the atmosphere through the discharge or drain pipe *g*.

Fig. 6 shows the adjustment of the handle *l* to the position marked "To the atmosphere". In this position the flow from the boiler to the tender storage tank is interrupted. But instead a connection is established with the sampling device so that samples of the boiler water may now be drawn off. Moreover a connection is now made with the pipe *g* which leads directly to the atmosphere whereby also the too highly saline water of the boiler can be blown off.

In the various drawings the direction of flow of the water is in all cases clearly indicated by means of arrows. The quantity of the flow can in the positions marked "To the tender" and "To the atmosphere" be regulated at will according to the scales provided.

I claim:—

A valve and test cock particularly for locomotive boilers comprising a casing having four channels; a plug in said casing and having a T-shaped passage therein adapted to cooperate with the channels; a handle connected to the plug and provided with an indicator hand adapted to cooperate with a

scale or dial fixed on the casing to indicate the various positions of the plug and the degree thereof; and a socket secured to one of the channels and having a mouth piece, valve and handwheel to draw off samples of the boiler water for test purposes, the second channel being adapted to be placed in communication with the water tank and then the atmosphere, the third directly with the atmosphere and the fourth channel in communication with the boiler, the plug by means of the handle permitting any degree of adjustment.

In testimony whereof I affix my signature.
WALTER KEIM.