July 6, 1926. 1,591,097

J. MONSEN

HEATER

Filed April 1, 1924

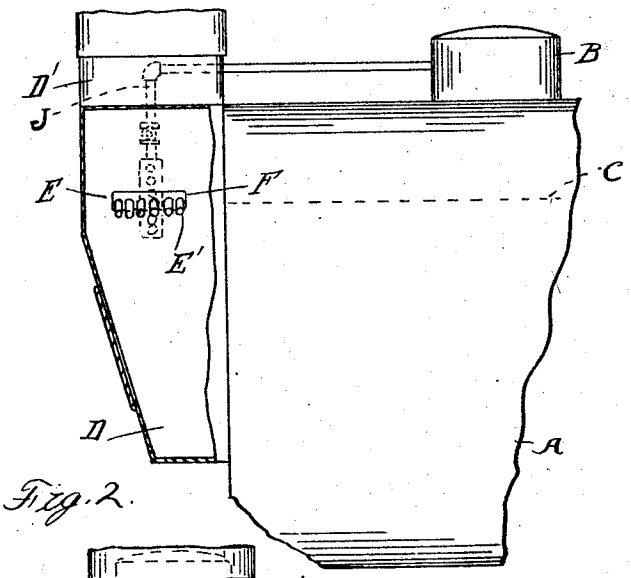


Fig. 1.

Fig. 2.

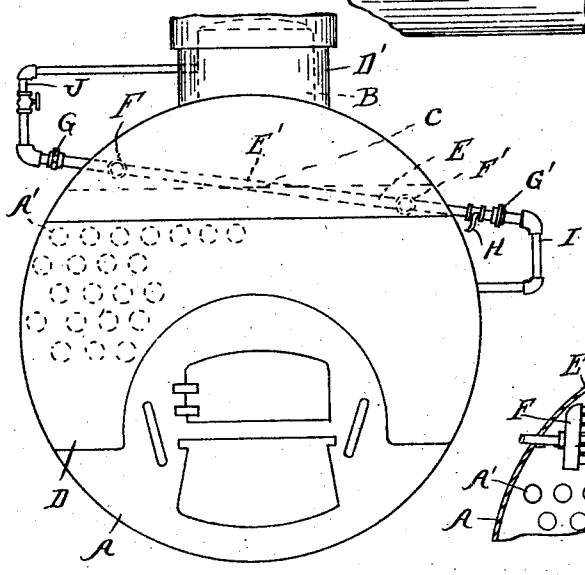
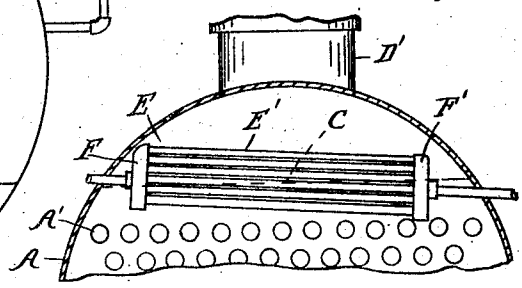


Fig. 3.



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UNITED STATES PATENT OFFICE.

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HEATER.

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The invention relates to economizers for steam boilers and is particularly adaptable for use in connection with boiler installations generating steam for heating purposes. Such installations are not ordinarily designed with such precision as to give the maximum efficiency obtainable, and as a consequence considerable heat is lost through the high temperature of the waste gases. In order to extract further heat from the stack gases it is possible to place an economizer in the stack, but this is often objectionable because it forms an obstruction and some times interferes with the draft.

It is the primary object of my invention to provide an economizer for increasing the efficiency of a boiler installation, but which is arranged so as to avoid impairment of the draft. Another object is to provide a construction which may be adjusted so as to vary the obstruction to the exhaust gases and to form in effect a draft regulator or damper. A further object is to arrange the economizer for the direct generation of additional steam instead of merely heating the feed water.

In the drawings:—

Figure 1 is a side elevation of a boiler, parts being broken away to show the location of the economizer;

Figure 2 is an end elevation of the boiler;

Figure 3 is a transverse section through the smoke box with the economizer in vertical position.

A represents the boiler shown in the drawings as a horizontal fire tube boiler having the longitudinal fire tubes A′ and the upper steam drum B, the water level being shown at C. D is the smoke box having the stack D′ extending upwardly therefrom.

My improved economizer comprises a grid E formed of a plurality of water tubes E′ connected at opposite ends to the headers F and F′. The grid is pivotally supported by the swivel brackets G and G′ to the boiler A and is preferably arranged so as to have portions thereof both above and below the water line C of the boiler. The brackets G and G′ are also arranged so that the water tubes E′ of the grid are at an inclination to a horizontal plane as shown in Figure 2, this arrangement placing the header F at a higher level than the header F′. The grid is arranged to be rotatable about the swivel brackets G and G′ and is adjustable by means of the handle H from a vertical to a horizontal position in the smoke box. In the former position the grid offers substantially no obstruction to the passage of the exhaust gases through the stack, while in the horizontal position substantially the entire amount of the stack gases must pass through the same thereby offering the maximum heating effect to the tubes E′.

The lower header F′ is connected through the swivel bracket G′ to a conduit I leading to the portion of the boiler below the water line, while the upper header F is connected by a similar connection J to the steam drum B.

With the construction as described the position of the grid in the smoke box may be manually varied, and when it is desired to obtain the greatest economy this may be accomplished by placing the grid in as near a horizontal position as is possible while still obtaining the necessary draft for the operation of the fire grate. If, however, the conditions are such that the draft is poor and the grid forms too much of an obstruction then it may be adjusted toward the vertical position until sufficient draft is obtained. By arranging the economizer so that it is always partly below and partly above the water line of the boiler the heat extracted from the waste gases is utilized in generating additional steam, whereas if it were placed entirely above the water line it would serve merely as a super-heater. This is particularly desirable when the economizer is utilized on boiler installations for domestic use in heating homes where it is not desired to obtain super-heated steam.

What I claim as my invention is:—

1. The combination with a boiler having a stack for waste gases, of an economizer arranged in said stack to permanently lie in the path of said gases and comprising a series of water tubes connected to said boiler above and below the water line therein, said economizer being mounted in said stack to pivot about an axis intersecting the gaseous passage and thereby variably restricting said passage.

2. The combination with a boiler having a stack for waste gases, of an auxiliary heater pivotally mounted in said stack to turn about an axis intersecting the gaseous passage and thereby variably obstructing said passage, said heater being arranged to have portions thereof above and below the water line in said boiler, and connections from the

upper and lower portions respectively communicating with said boiler above and below the water line.

3. The combination with a boiler having a stack for waste gases, of an auxiliary heater arranged in said stack to pivot about an axis inclined to cross the water level in the boiler whereby the passage through said stack is variably obstructed and said heater is partially below said water level in all its positions of pivotal adjustment, said heater comprising a series of water tubes having portions thereof above and below the water line in said boiler, headers for said tubes, and connections from said headers respectively communicating with said boiler above and below the water line.

In testimony whereof I affix my signature.

JOHN MONSEN.