May 28, 1929. H. J. KERR ET AL 1,715,037

ECONOMIZER

Filed Jan. 24, 1927

Fig. 1



Fig. 2

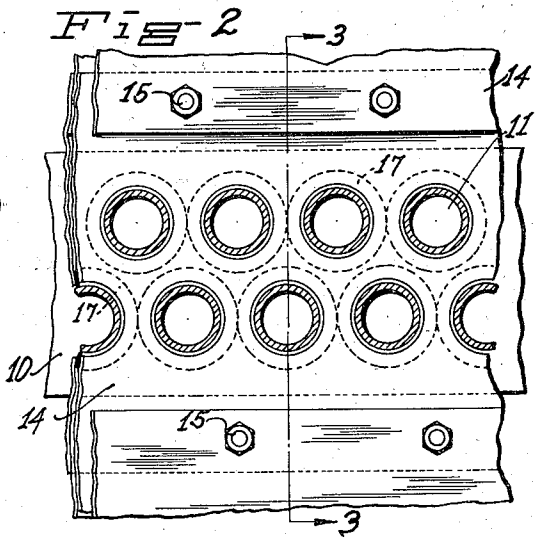


Fig. 3

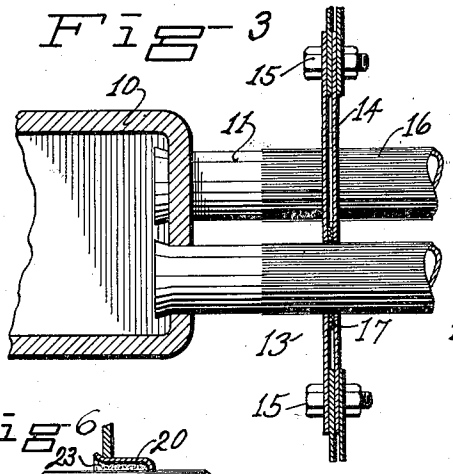


Fig. 6

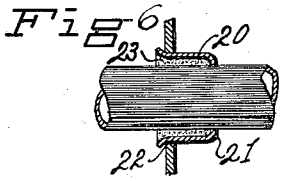


Fig. 5

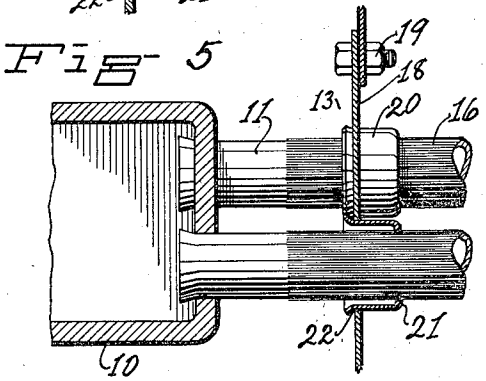
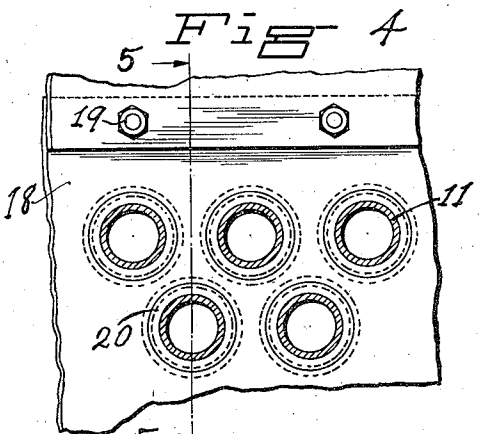


Fig. 4



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UNITED STATES PATENT OFFICE.

HOWARD J. KERR, OF WESTFIELD, NEW JERSEY, AND JAMES E. TRAINER, OF BARBERTON, OHIO, ASSIGNORS TO THE BABCOCK & WILCOX COMPANY, OF BAYONNE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

ECONOMIZER.

Application filed January 24, 1927. Serial No. 162,966.

This invention relates to economizers in which the tubes are coated with material to prevent corrosion. The invention will be understood from the description in connection with the accompanying drawings in which Fig. 1 is a side elevation, partly broken away, showing the economizer; Fig. 2 is a view on an enlarged scale showing a section, partly broken away, through the economizer; Fig. 3 is a section along the line 3—3 of Fig. 2; Fig. 4 is a sectional view similar to Fig. 2 showing a modification; Fig. 5 is a section along the line 5—5 of Fig. 4, and Fig. 6 is a sectional view showing one of the details.

It has been found that the tubes of economizers are very apt to be corroded in use and for this reason it is desirable to coat the same with material, such as glazed material similar to enamel, that will prevent corrosion. At the same time, it is inadvisable to extend the coating material entirely to the ends of the tubes, because the same will be displaced or cracked off when it is attempted to expand the ends of the tubes into the headers. By the present invention the coating material terminates short of the headers and a wall, which constitute one of the sides of the gas passage across which the tubes of the economizer are located, is placed near the headers, and the tubes extend through this wall so that the coating on the material terminates between this wall and the headers and, at the same time, a gas-tight connection is made between this wall and the portions of the tubes upon which there is coating material.

In the drawings, reference character 10 indicates the headers of an economizer which, in this illustrated embodiment of the invention, is shown with U-tubes 11 connecting the headers, the headers exemplifying connections for the tubes. One wall of the gas passage across which the tubes 11 extend is shown at 12 close to the bends of the U-tubes, and the opposite wall of this gas passage is shown at 13 spaced a short distance from the headers 10 and extending across the tubes 11.

The tubes 11 pass through the wall 13 and gas-tight joints are provided between the tubes and the wall. As shown in Figs. 2 and 3, the wall 13 is made up of pairs of plates 14 that are slightly spaced apart with the edges of the pairs of plates connected by means of bolts 15. The coating material, which may, for example, be a vitreous enamel, covers the entire tubes except for a short distance from the ends thereof, which are expanded into the headers 10. As clearly shown in Fig. 3, this coating material terminates between the wall 13 and the headers 10. The gas-tight joint between the wall 13 and the coating 16 on the tubes 11 is made, as shown in Fig. 2, of washers 17 that fit the outside of the coating 16 very closely and are located between the respective pairs of plates 14 and thereby kept in place to prevent gas from escaping from the gas passage and coming into contact with the bare portions of the tubes near their ends as well as the headers 10.

In the modification shown in Figs. 4, 5 and 6, the wall 13 is made up of single plates 18 that are connected along their edges by means of the bolts 19 and the gas seal is made up of thimbles 20, one end of which, as shown at 21, fits closely around the outside of the enamel 16 on the tubes and the other end 22 is made somewhat conically shaped so as to provide a gas-tight joint with the plate 18. If desired, packing material 23 (Fig. 6) may be placed in the thimbles 20 to make a gas-tight joint between the thimbles 20 and the tubes 11, when the thimbles themselves do not.

The coating material may be applied to the tubes either before or after they are expanded into the headers, and may consist of glazed or vitreous material or of plating that will prevent the tubes from corrosion due to fumes or acids from the gases that contact with the tubes, and will also withstand the elevated temperatures in the economizers as well as prevent the tubes from becoming rusty because of the fact that water or steam is periodically sprayed over them to clean off the dust and soot that has lodged thereon. Since such coating material is often brittle and it is more convenient to apply it before the tubes are expanded in place, it is therefore advisable to leave the ends of the tubes free from the coating material. A good joint can then be obtained at an uncoated part, which is difficult to do when the coating is present. The wall 13 not only protects the uncoated portions of the tubes and headers from the fumes and acids but also from the steam and water used for cleaning the tubes.

We claim:

1. In an economizer, headers, tubes coated with non-corrodible material connected to said headers and having their ends free from said coating material, a wall near said headers through which said tubes pass, and gas-tight seals between said tubes and wall.

2. In an economizer, headers, tubes coated with non-corrodible material connected to said headers, a wall near said headers through which said tubes pass, and gas-tight seals between said tubes and wall, the coating on said tubes terminating between said wall and said headers.

3. In an economizer, headers, tubes coated with non-corrodible material connected to said headers, a wall near said headers through which said tubes pass, and gas-tight seals between said tubes and wall, each comprising a ring-shaped portion fitting tightly around the coating on said tubes.

4. In an economizer, headers, tubes coated with non-corrodible material connected to said headers, a wall near said headers through which said tubes pass, and gas-tight seals between said tubes and wall, each comprising a ring-shaped portion fitting tightly around the coating on said tubes and another portion forming a gas-tight seal with said wall.

5. In combination, means defining a gas pass, a connection having a tube joined thereto at one end and extending into said pass, said tube being coated with non-corrodible material within the pass but uncoated with said material where it is joined to the connection.

6. In combination, means defining a gas pass, a connection having a tube joined thereto at one end and extending into said pass, said tube being coated with non-corrodible material within the pass but uncoated with said material except where it is joined to the connection, and a gas tight seal surrounding the tube on its coated portion and preventing gases reaching the uncoated portion.

7. In combination, two tubes extending into a gas pass and having ends disposed outside of said pass on one side thereof, and a connection also disposed outside of said pass and joining said tube ends, said tubes being coated with non-corrodible material within the pass but uncoated where they are joined to said connection.

8. In combination, means defining a gas pass, a connection having a tube joined thereto at one end and extending into said pass, said tube being coated with non-corrodible material within the pass but uncoated therewith where it is joined to the connection, and means preventing gases from said pass reaching the uncoated part of the tube.

HOWARD J. KERR.
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DISCLAIMER

1,715,037.—*Howard J. Kerr,* Westfield, N. J., and *James E. Trainer,* Barberton, Ohio. ECONOMIZER. Patent dated May 28, 1929. Disclaimer filed October 23, 1929, by the assignee, *The Babcock & Wilcox Company.*

Hereby enters this disclaimer to the combination of elements set forth in each of claims 5 and 7 of said Letters Patent except when the "non-corrodible material" of said elements is one which is chemically neutral with respect to the material of the tube or tubes and which is applied to the outside thereof and caused to adhere thereto, leaving the material of the tube or tubes unchanged.

[*Official Gazette November 12, 1929.*]

DISCLAIMER

1,715,037.—*Howard J. Kerr,* Westfield, N. J., and *James E. Trainer,* Barberton, Ohio. ECONOMIZER. Patent dated May 28, 1929. Disclaimer filed August 5, 1930, by the assignee, *The Babcock & Wilcox Company.*

Hereby enters this disclaimer to that part of the claims in said specification, which are in the following words, to wit:

"5. In combination, means defining a gas pass, a connection having a tube joined thereto at one end and extending into said pass, said tube being coated with non-corrodible material within the pass but uncoated with said material where it is joined to the connection."

"7. In combination, two tubes extending into a gas pass and having ends disposed outside of said pass on one side thereof, and a connection also disposed outside of said pass and joining said tube ends, said tubes being coated with non-corrodible material within the pass but uncoated where they are joined to said connection."

[*Official Gazette August 26, 1930.*]