June 17, 1924. 1,498,440

H. FOTHERGILL

EVAPORATOR

Filed June 21, 1921 3 Sheets-Sheet 1

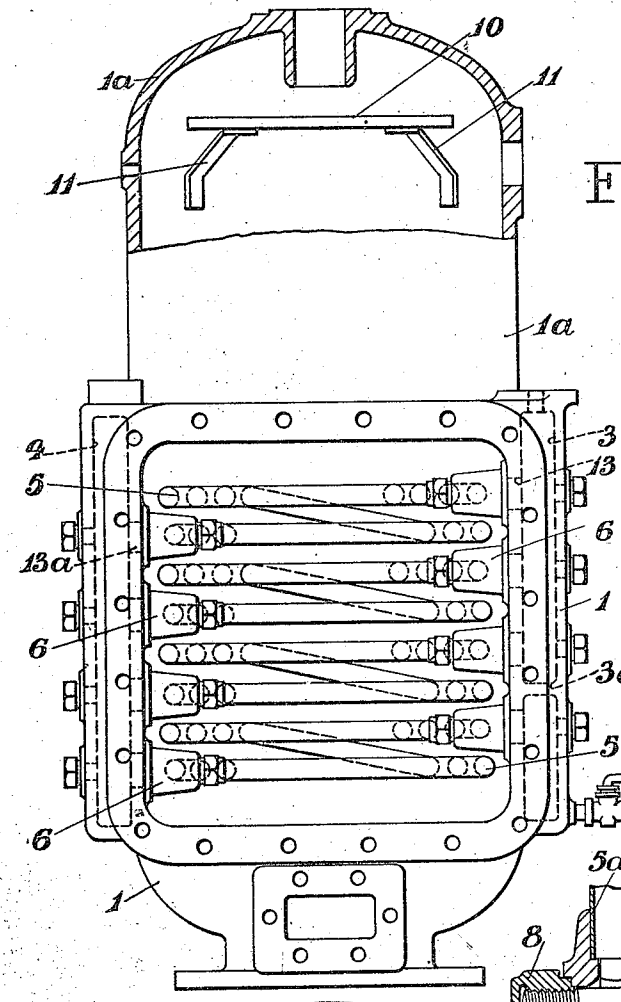


Fig. 1.

Fig. 4

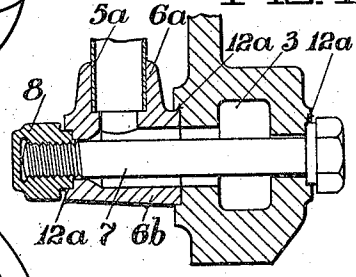
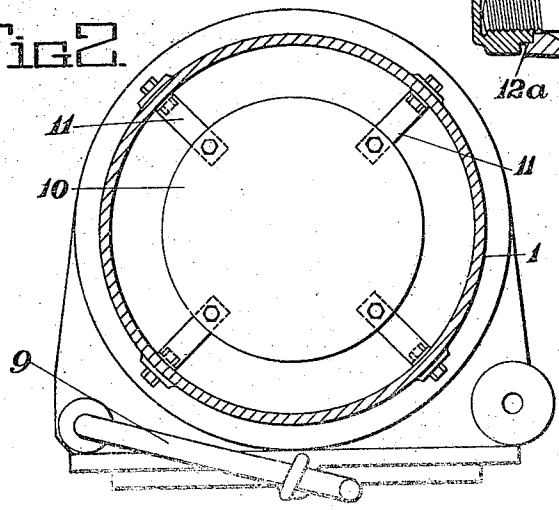


Fig. 2.



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Filed June 21, 1921 3 Sheets-Sheet 2

Fig 3.

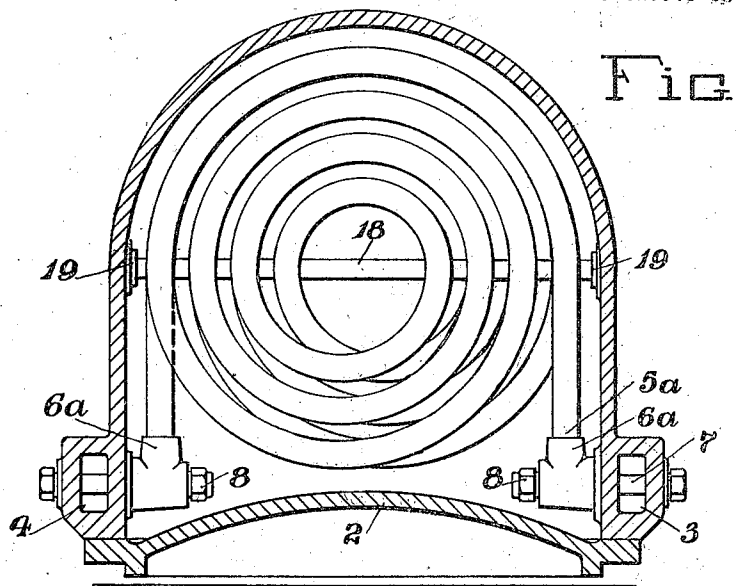
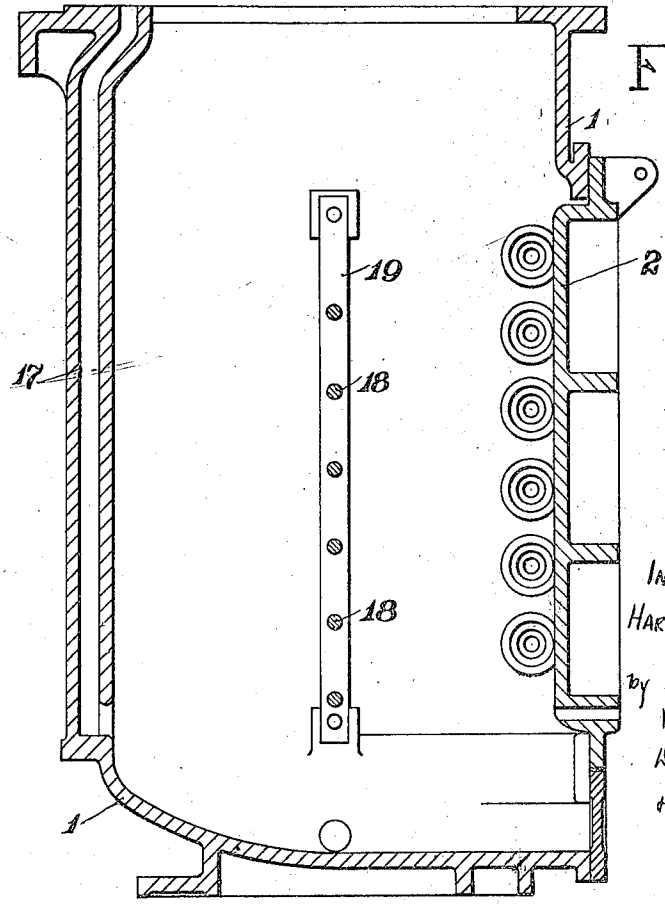


Fig 6.



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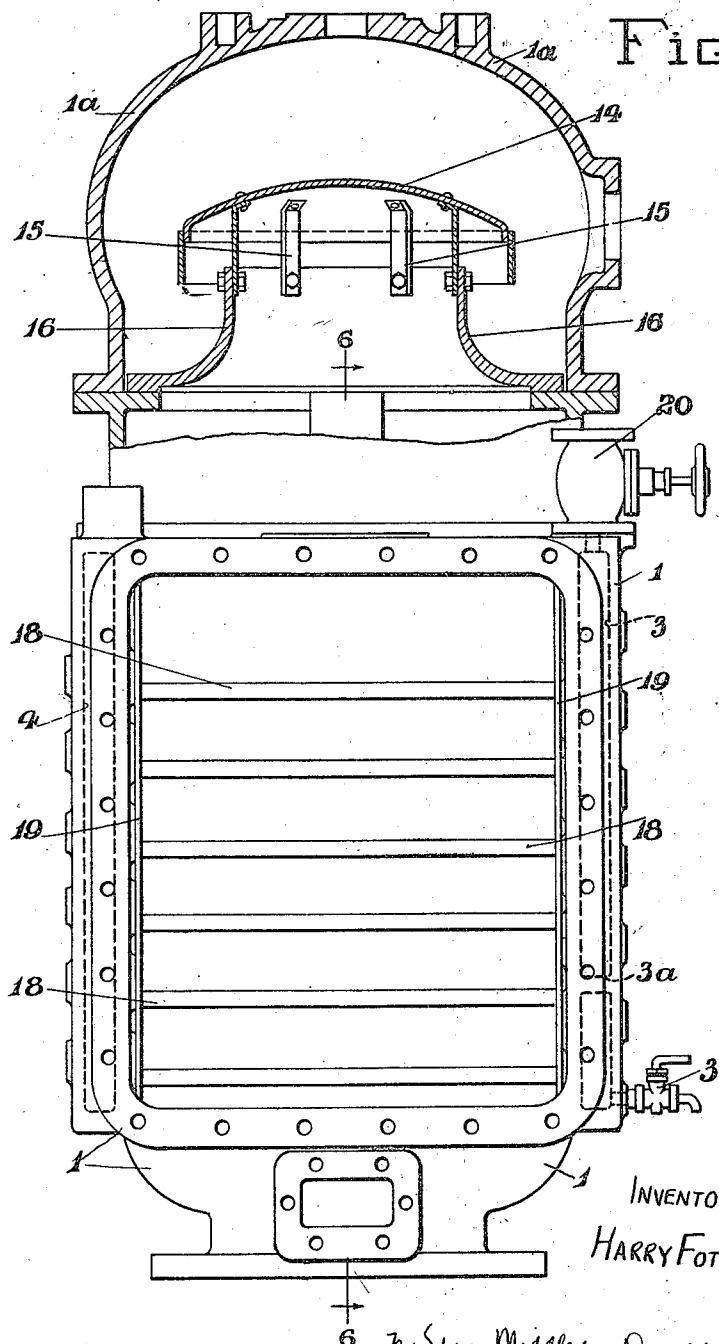
June 17, 1924. 1,498,440

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Filed June 21, 1921 3 Sheets-Sheet 3

Fig 5.



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UNITED STATES PATENT OFFICE.

HARRY FOTHERGILL, OF WESTMINSTER, LONDON, ENGLAND.

EVAPORATOR.

Application filed June 21, 1921. Serial No. 479,252.

To all whom it may concern:

Be it known that I, HARRY FOTHERGILL, of Westminster, London, in the county of London, England, have invented certain new and useful Improvements in Evaporators, of which the following is a specification.

This invention consists of an improved evaporator, and relates particularly to the method employed for coupling the coils to a steam inlet chamber and a water drainage chamber.

It is common practice in evaporators to braze the ends of the coils to hollow coupling pieces which extend into the chambers above mentioned and are held in position by external nuts. Such an arrangement, however, necessitates the withdrawal of the coupling pieces from the chambers whenever it is desired to remove a coil, and this necessitates either a large or special formation of the evaporator body, or such a disposition of the steam inlet and drainage chambers as is not always convenient. It is also common practice to use a coupling union, which is screwed into the interior wall of the steam space and drainage chambers, but with such an arrangement it frequently happens that when uncoupling the coil from the union, the union is unintentionally unscrewed or loosened in the wall of the evaporator.

The present invention consists of a particular construction and arrangement of evaporator as hereinafter described, and the invention also involves an improved coupling piece which is designed for simplicity of construction and ease of manipulation.

An evaporator constructed in accordance with my invention comprises a hollow shell having at its front an opening fitted with a vertical door, and on each side of the opening is arranged a chamber in the form of a vertical passage. One of these chambers forms a steam space for the inlet into the coils, while the other chamber forms a space for the collection of the water drainage. The coils are connected to the chambers by removably secured fitments.

In order that the invention may be clearly understood and readily carried into practice the same will now be more fully described with reference to the accompanying drawings in which:—

Fig. 1 is an elevation partly in section showing an evaporator constructed in accordance with the invention the door being removed to show the coils in position. This figure also shows the form of coupling piece.

Fig. 2 is a sectional plan through the shell showing one form of baffle.

Fig. 3 is an enlarged sectional plan through the shell and door.

Fig. 4 is an enlarged sectional detail of one of the coupling pieces.

Fig. 5 is an elevation similar to Fig. 1 of an evaporator having a separate steam dome and modified form of baffle, the coils being removed.

Fig. 6 is a sectional elevation taken as on the line 6—6 of Fig. 5, the steam dome being omitted.

Referring to the drawings the numeral 1 represents the shell of the evaporator, 2 the door, 3 the steam inlet chamber, 4 the water drainage chamber and 5 the steam coils.

The coils 5, which may be of the single or double type, are arranged in horizontal planes with one end connected to the steam inlet chamber 3, and the other end connected to the water drainage chamber 4 by couplings of the kind hereinbefore referred to in general. The lower portion of the steam inlet chamber 3 may be separated by a partition 3^a, and the lower coil in the evaporator so arranged that the hot drainage water from the drainage chamber passes through it into the lower and separate portion of the steam chamber from which the drainage water is discharged through the cock 3^b. By this means a portion of the heat in the drainage water can be beneficially used for heating the water in the base of the evaporator.

In the arrangement shown in Figs. 1 to 4 each coupling piece 5 consists of a hollow fitment of substantially T form, each of the ends 5^a of the coil being brazed or otherwise connected with the leg 6^a of the T fitments 6 which fitments and the coil to which they are attached are removably secured in position by means of a bolt 7 passing through the steam inlet chamber 3 and drainage chamber 4 respectively and the cross piece 6^b of the appropriate T fitment, a nut 8 screwing on to the end of the bolt 7 this nut in the example shown being located within the evaporator shell. The coupling bolts 7 may be made of non-corrosive material and may, if desired, be reversed from the position shown in the drawings so that the nuts 8 are on the outside of the evaporator shell.

Thus, to remove a coil, it is only necessary to remove the evaporator door 2 in the usual way, a crane bar 9 being provided for this purpose, unscrew the nuts 8 and withdraw the bolts 7 when the coil 5 as a whole is free to be removed. In the case of evaporators of small size a simple baffle plate 10 located in the upper portion of the shell and retained in position by supporting lugs 11 serves to prevent any water being carried away with the steam.

The joints between the coupling piece and the steam or drainage chamber and the bolt and nut are made with washers of suitable material such as a combination of copper and asbestos, recesses 12^a being provided in the walls of the steam, or drainage chamber to receive such washers.

Referring to Fig. 5 the upper portion 1^a of the shell or a separate portion attached thereto, forms a dome or steam space for the steam generated by the evaporator, the steam which enters this dome or steam space preferably passing through a suitable baffle 14 which prevents water being carried away by the steam; as shown in this figure the baffle 14 is carried by supports 15 bolted or otherwise secured to the baffle base 16 located within the evaporator shell or dome 1^a. The arrangement is such that any water which may be carried through the baffle is collected and drained through a pipe, or a passage 17 (Fig. 6) in the shell of the evaporator, and delivered to the base.

The evaporators are provided with the usual external mountings and means for supporting the coils. The coil supports consist of bars 18 riveted into supporting plates 19 bolted or otherwise secured to the shell.

The steam is introduced into the steam inlet chamber 3 through a screw lift valve 20 and it will be understood that it passes into the respective coils 5 through the openings 13 and hence into the drainage chamber through the openings 3^a, the water being drained off or discharged by means of the cock 3^b at the bottom of the evaporator.

What I claim and desire to secure by Letters Patent is:—

1. An evaporator comprising a hollow shell having an opening, a vertical door closing said opening, a steam inlet chamber in the form of a vertical passage formed in the evaporator shell and located on one side of said opening, a water drainage chamber formed in the evaporator shell and located on the other side of said opening, coils each connected at one end to the steam inlet chamber and at the other end to the water drainage chamber, coupling pieces for effecting the connection of said coils, said coupling pieces each comprising a hollow fitment of substantially T-form to the single leg of which one end of the coil is permanently united, headed bolts adapted to be passed through the steam inlet and water drainage chambers respectively, and the cross piece of the cooperating T-shaped fitment, and nuts for securing said bolt.

2. An evaporator comprising a hollow shell, a steam inlet chamber, a water drainage chamber, coils each connected at one end to the steam inlet chamber, and at the other end to the water drainage chamber, coupling pieces for effecting the connection of said coils, said coupling pieces each comprising a hollow fitment of substantially T-form to the single leg of which an end of the coil is integrally united, a headed bolt adapted to be passed through the steam inlet and water drainage chambers respectively, and through the cross piece of the appropriate T-shaped fitment, and a nut for securing said bolt.

3. In evaporators, a shell, steam inlet and water drainage chambers in the walls of said shell, removable coils having hollow substantially T-shaped fitments whose single legs are permanently secured to the coil ends, said fitments being adapted to be secured in position by bolts passing through the cross pieces of said hollow fitments and through the steam inlet and water drainage spaces of the evaporator, substantially as specified.

In testimony whereof, I affix my signature.

HARRY FOTHERGILL.