

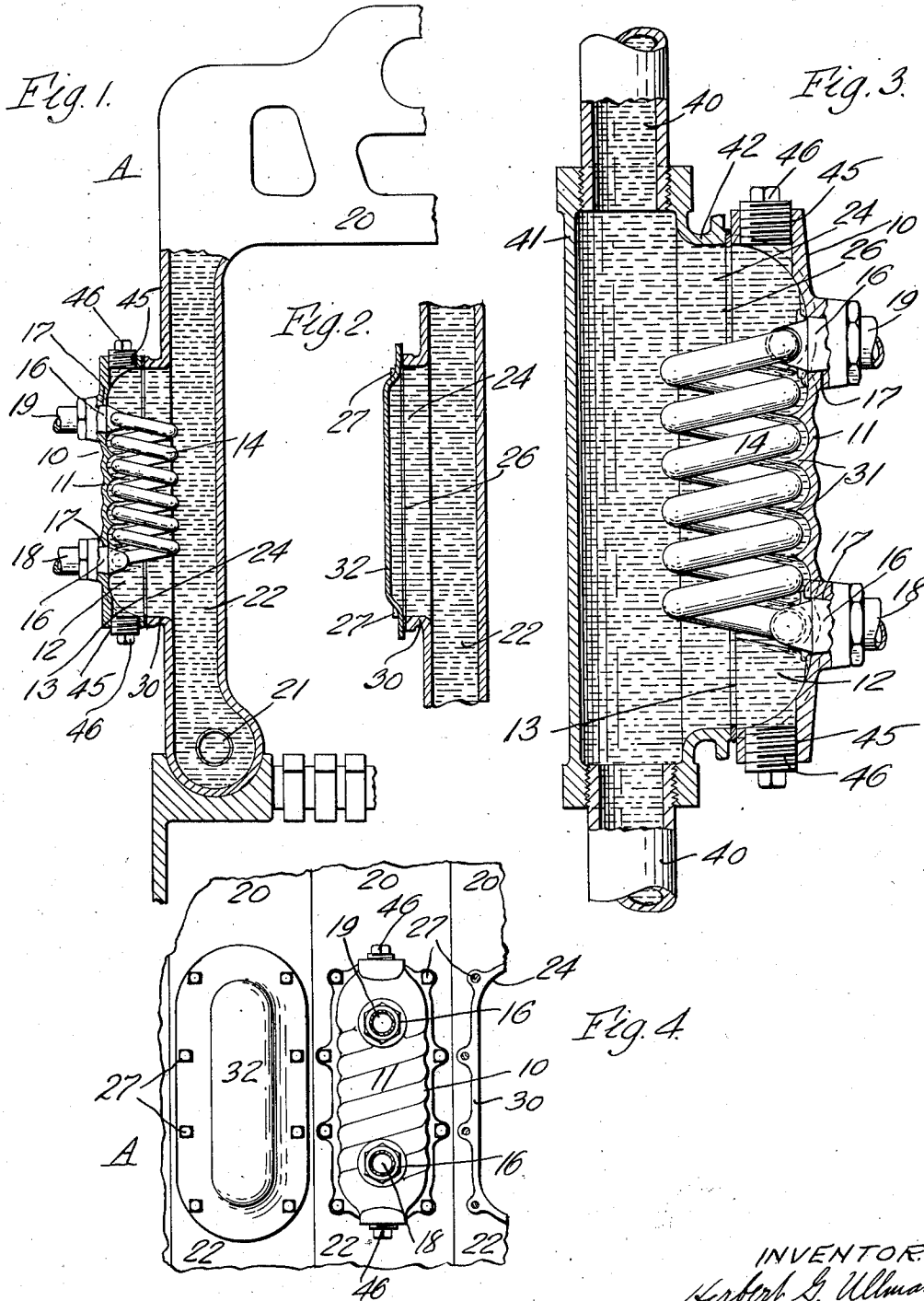
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H. G. ULLMAN

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HEAT INTERCHANGER

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INVENTOR
Herbert S. Ullman
by Parker & Prochnow
ATTORNEYS

UNITED STATES PATENT OFFICE

HERBERT G. ULLMAN, OF TUCKAHOE, NEW YORK

HEAT INTERCHANGER

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This invention relates to heat interchangers of that kind having a coil which is arranged to be connected, for example, in a domestic water supply line or other system, and which can be placed into operative relation to a hot water or similar fluid heating and circulating system, whereby the water in the coil is heated by the exchange of temperatures, as well known.

The objects of the invention are to provide a heat interchanger in the form of a detachable unit which can be readily applied to or removed from a wall of a boiler, passage or the like of a fluid heating or similar system so that the coil of the interchanger is entirely immersed in the fluid circulating in the system, also to provide a device of this kind which is so constructed that a minimum loss of heat waste results from its use; also to construct a heat interchanger which can be removed from the system to which it is attached without causing the shutting down of the system for an objectionable time, and also to improve and simplify heat interchangers in the other respects hereinafter set forth and claimed.

In the drawings:

Fig. 1 is a vertical section of the leg of one section of a sectional boiler or heater, having attached thereto the improved heat interchanger unit embodying my invention.

Fig. 2 is a fragmentary sectional view of the leg with the shell and heat interchanger unit removed and the opening in said leg closed by a plate or cap.

Fig. 3 is a similar view showing the heat interchanger unit attached to a fitting disposed in a passage or pipe of a fluid heating system.

Fig. 4 is a side elevation of a portion of a sectional heater showing the unit of Fig. 1 and the plate of Fig. 2 applied respectively to adjoining sections.

In the embodiment of the invention illustrated in the drawings, the heat interchanger unit comprises a concaved shell or trough-like plate 10, the wall 11 of which forms a recess or pocket 12. The annular edge 13 of the shell is machined or finished flat and is disposed, (in the arrangement shown) in

a vertical plane. A tubular coil 14 of any well known form, and preferably constructed of copper or other metal of high conductivity, is disposed within the recess 12 and has its opposite ends secured, as by couplings 16, fitting in and extending through holes 17 in said shell wall, to inlet and outlet pipes or passages 18 and 19 through which water or any other suitable medium is introduced into and discharged from the coil.

In Figs. 1, 2 and 4 is shown a portion of a sectional boiler or heater A of a circulating system, having sections 20 clamped together in the usual manner and communicating with each other through thimbles 21, fitting in apertures in their adjacent walls. The leg 22 of one, or more, of the sections 20, is formed with a hole or opening 24 in its outer side. Each opening 24 corresponds in size with the open face or edge 13 of the shell 10 and its edge 26 is also finished flat, so as to receive the shell 10, the latter being secured thereto by suitable screws or bolts 27. A gasket is interposed between said edges 13 and 26 to provide a fluid tight joint.

The opening 24 is preferably formed at the edge of a flange or projection 30 extending laterally from the wall of the leg 22, which flange, together with the recess or pocket 12 of the shell 10, forms a chamber which is offset from the interior of the leg and is sufficiently large to receive the coil 14.

By the construction described the water, steam or other fluid medium in the section 20 can circulate freely in the leg 22 and pass over the coil 14 to effect the desired exchange of heat, while nevertheless the interior of the leg remains substantially unobstructed and the circulation of the fluid therethrough is in no way impeded by the presence of the coil.

If desired, the side wall 11 of the shell 10 can be provided with interior ribs or corrugations 31 extending towards or into the adjacent spaces between the turns of the coil 14, to cause a thorough contact and movement of the liquid about the coil, and to prevent the formation of a relatively inactive strata of this liquid between the side wall 11 and the coil.

When, for any reason, it is desired to remove the coil 14 it is only necessary to take out the bolts or screws 27, when the entire unit, comprising the shell 10 and coil 14 can be detached. This procedure renders the system inoperative for only a short period, as the unit can be replaced and the opening or edge of the flange 30 easily closed, as by a suitable plate 32, see Fig. 2, secured by the same fastenings 27.

In the construction shown in Fig. 3, the heat interchanger unit is disposed in a pipe or passage 40, such, for example, as the riser or discharge pipe leading from the top of a boiler or heater of a circulating system. For this purpose, said pipe is preferably made in two sections, the threaded ends of which are connected to a T fitting 41 having a lateral extension 42 corresponding to the flange 30 of the boiler sections 20. The edge 24 of the shell 10 is secured over the opening of the extension 42 by bolts, as before. The coil is thus disposed in an offset recess of the passage or pipe 40, as in the first construction, so that while the medium passing through said pipe can circulate freely about the coil 14, the flow of this medium through the pipe is substantially unimpaired.

As illustrated, the shell 10 preferably has threaded bores or apertures 45 at its opposite ends, which are adapted to receive the ends of threaded pipes or the like, not shown, whereby a fluid can be introduced into the shell about the coil 14 from a source other than from the sections 20, should such action be desirable. This arrangement also permits the units to be used in other ways. When the units are used in the manner before described however, these apertures are closed by plugs 46.

The heat interchanger unit described is of relatively simple and inexpensive construction, and the same is adapted for use in a wide variety of different installations. It can be attached horizontally or vertically. The coil is entirely submerged in the medium in the heater, pipe or other passage and effects a maximum of temperature exchange with a minimum loss of radiation and the minimum of additional fuel consumption. At the same time the efficiency of the boiler or system is unimpaired, as the coil is located laterally of the passage or compartment to which it is attached and the passage is therefore unobstructed by said coil.

Claims:—

1. The combination with a circulating system having a passage through which a fluid medium is circulated, said passage having an open ended extension projecting laterally from a side wall thereof, of a heat interchanger unit comprising a shell formed to fit over and close the opening of said extension, and a tubular coil mounted on said shell and through which a second fluid medium is

passed, said coil being confined within said extension so as to be immersed in the medium flowing through said passage at one side thereof without obstructing said passage or impeding the movement of said medium through the latter.

2. The combination with a circulating system having a passage through which a fluid medium is circulated, said passage having an open ended extension projecting laterally from a side wall thereof, of a heat interchanger unit comprising a concaved shell formed to fit over and close said opening with its concavity facing the latter, and a tubular coil, through which a second fluid medium is passed, mounted on said shell within said concavity and projecting into said extension, whereby said coil is immersed in the medium flowing through said passage at one side thereof without obstructing said passage or impeding the movement of said medium through the latter.

3. The combination with a circulating system having a passage through which a fluid medium is circulated, said passage having an opening in a wall thereof, of a heat interchanger unit comprising a concaved shell formed to fit over and close said opening with its concavity facing the latter, a tubular coil through which a second fluid medium is passed and which is mounted on said shell within the concavity thereof and having its ends secured to connections in the wall of said shell, and said shell also having a pair of plugged apertures at its opposite ends with reference to the ends of said coil to permit said shell to be attached to a source of fluid medium other than that in said passage.

HERBERT G. ULLMAN.