Sept. 11, 1934. R. P. THOMPSON 1,973,129

BOILER

Filed April 12, 1932 2 Sheets-Sheet 1

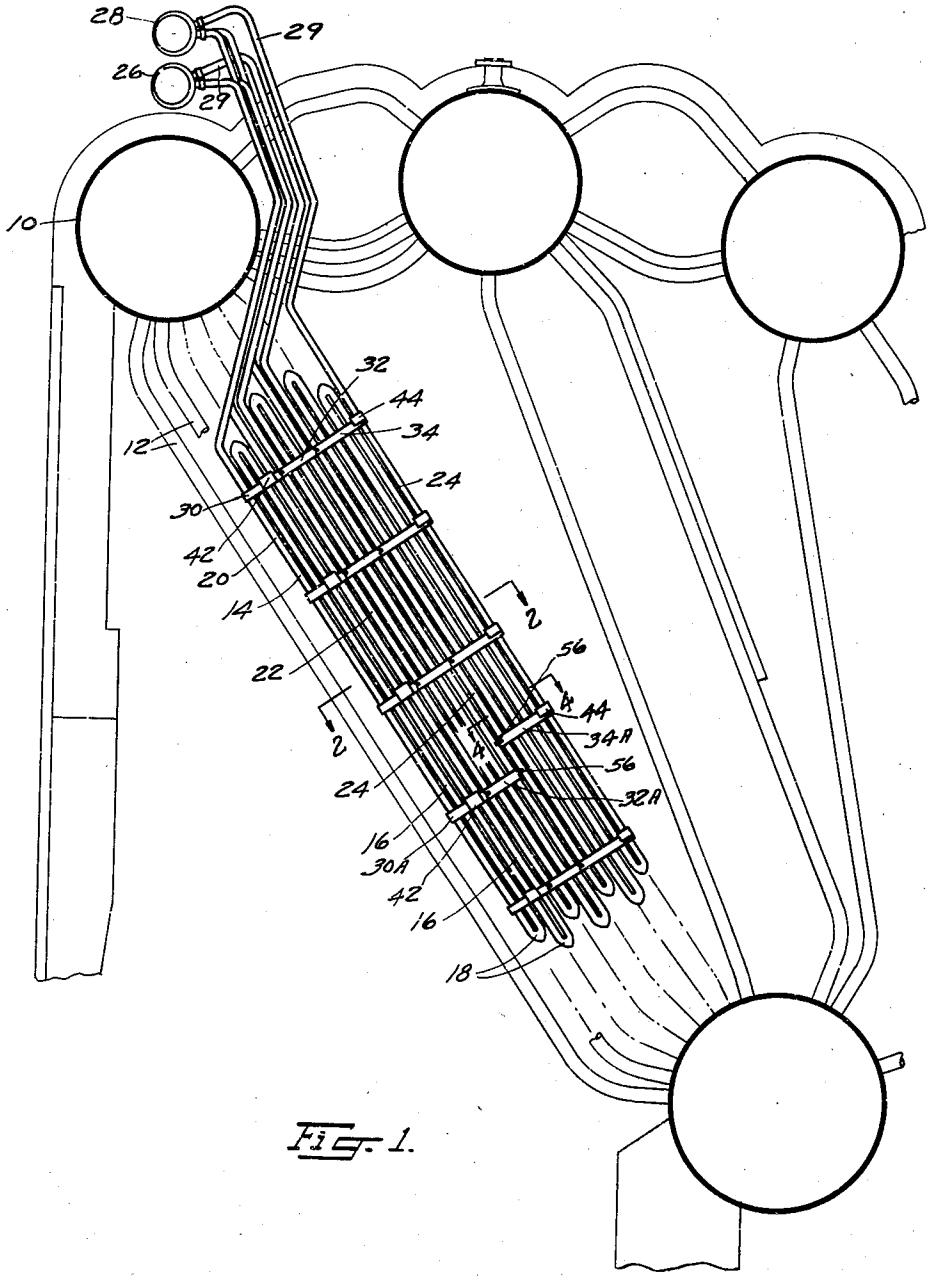


Fig. 1.

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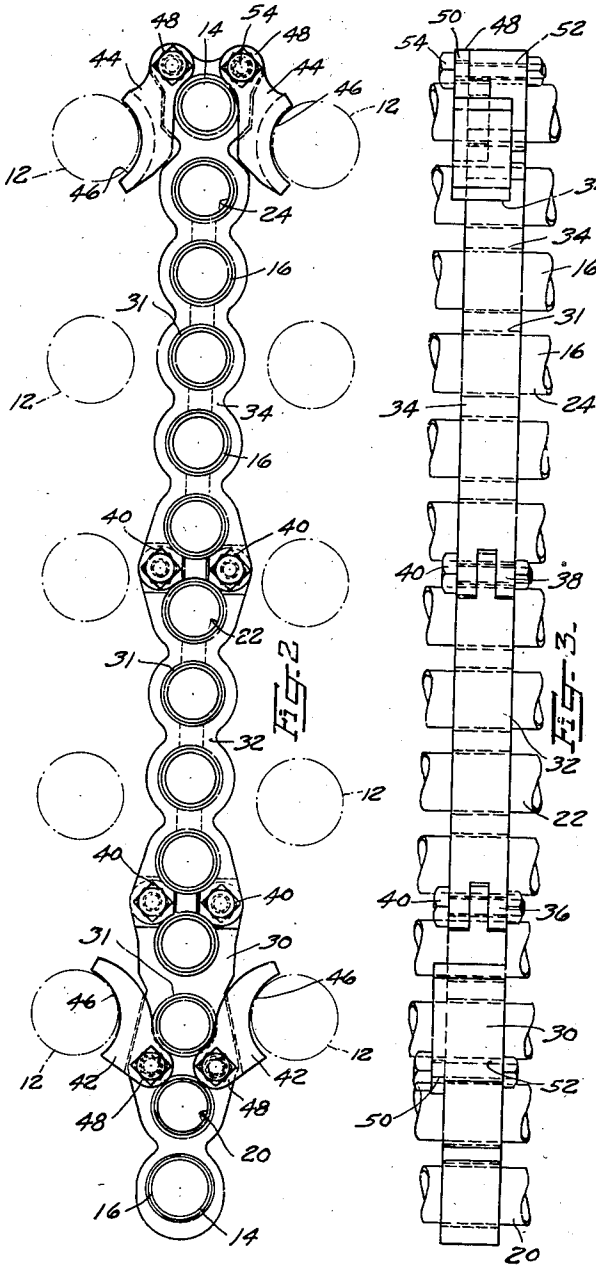


Fig. 2.

Fig. 3.

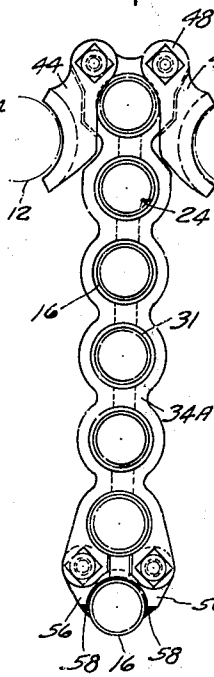


Fig. 4.

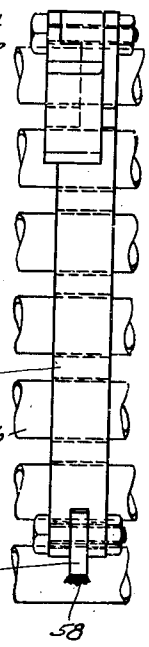


Fig. 5.

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Patented Sept. 11, 1934 1,973,129

UNITED STATES PATENT OFFICE

1,973,129

BOILER

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Application April 12, 1932, Serial No. 604,736

5 Claims. (Cl. 122—478)

My invention relates to an attachment for use in connection with tubular elements of heaters intended for use in connection with water tube boilers.

It is customary to suspend serpentine tubular elements of superheaters and like devices in lanes between the rows of generating tubes of water tube boilers. In order that the superheater or like elements may interfere as little as possible with the desired flow of gases between and around the generating tubes, it is desirable to connect the pipe runs of a given serpentine tubular element by spacers to hold them in fixed relation with each other. It is desirable also to support the serpentine elements from the boiler tubes in fixed relation to the latter.

It is the principal object of my invention to provide a device of simple rugged and economical character and adapted to perform both of the functions just mentioned.

The novel features of my invention are pointed out with particularity in the appended claims. In order, however, that the invention may be fully and easily understood, I will now describe in detail, by way of example and in connection with the accompanying drawings, two combined spacer and supporting means which have been selected from a number of possible embodiments of my invention. In the drawings,

Fig. 1 is a sectional elevation of a known form of superheater boiler having my invention applied thereto.

Fig. 2 is a fragmentary sectional view on the line 2—2 of Fig. 1 and looking in the direction of the arrows.

Fig. 3 is a fragmentary elevational view of a portion of Fig. 1 drawn to an enlarged scale.

Fig. 4 is a fragmentary sectional view taken on the line 4—4 of Fig. 1 and looking in the direction of the arrows.

Fig. 5 is a fragmentary elevational view of the portion of Fig. 1 appearing in Fig. 4 and drawn to an enlarged scale.

Referring to the drawings more in detail, 10 indicates a Stirling type boiler having a front bank of generating tubes 12, 12 arranged in rows transversely to the drums of a boiler. In the lanes between the rows of tubes 12 are superheater unit assemblies, one of which appears at 14. Two types of combined spacers and supports in accordance with my invention are shown in Fig. 1. One such type is shown more in detail in Figs. 2 and 3, the other such type appearing more in detail in Figs. 4 and 5.

Referring more particularly to Figs. 2 and 3, the unit assembly 14 is built up of units having parallel tube runs 16, 16 connected for series flow therethrough by means of return bends 18, 18 (Fig. 1). Each of the assemblies 14 is shown as formed of three units, 20, 22 and 24 respectively which are connected in parallel between headers 26 and 28 one of which is for saturated and the other for superheated steam. The units 20, 22 and 24 are manufactured separately, each having individual leads 29, 29 for connecting it with headers 26 and 28. The individual tube runs 16 are united by the return bends 18 which may be formed integrally thereon by welding and forging in a known manner. For spacing the tube runs 16 of each individual unit of the unit assembly 14, rigid blocks 30, 32 and 34 are employed having sockets 31, 31 individual to tube runs 16. Each of blocks 30, 32 and 34 preferably is slipped over the tubes 16 which are to be formed into a given individual unit portion 22, 24 or 26 before the return bends 18 are formed thereon and the individual runs then connected up by the return bends to form one of the serpentine portions 20, 22 or 24 having a spacer block 30, 32 or 34 individual thereto. The individual tube runs are thereby accurately and positively spaced from each other. The block portions or sections 30, 32 and 34 preferably are formed by casting and so that sockets 31 are complete cylinders. I do not limit myself to either of such features, however. The individual unit parts 20, 22 and 24 having been formed with the spacer blocks 30, 32 and 34 thereon, are fabricated into a complete assembly 14 having the runs 16 of all the parts in a given plane. This may be done by connecting the block 30 to one end of block 32 and block 34 to the other end of block 32. For this purpose, blocks 30, 32 and 34 have apertured lugs adapted to interleave, as shown at 36 and 38 (Fig. 3), so as to be connected by two pairs of bolts 40, 40 into an inflexible whole. Another way of connecting a plurality of sections or units to form therefrom a complete assembly is described hereinbelow in connection with Figs. 4 and 5.

In order to support the assemblies, such as 14, from the boiler tubes 12 or the like, I provide lugs 42, 42 and 44, 44 which have arcuate surfaces 46 adapted to partially embrace tubes 12. The lugs, such as 42 and 44, are formed separately from the spacer portions 30, 32 and 34 and have ears 48 adapted to lie against one of the transverse faces of the blocks 30 or 34 and which have apertures 50 adapted to register with apertures 52 in blocks 30 and 34. Each of the hanger lugs 42 and 44 has an arcuate face 46 and is so formed as to slip in between one of the tubes 12 and one of the tubes 16 so that when they have been bolted in place by passing bolts such as 54 thru apertures 52, one of tubes 16 contacts with the inner face of each lug 42 or 44 and such tube 16 of the serpentine assembly holds the hanger lug 42 or 44 so that its arcuate face 46 can not slip past the tube 12

with which it contacts and the assembly 14 is thereby suspended in its desired position. Preferably, the arcuate face 46 of the hanger lugs 42 and 44 overlaps the body of the spacer portion or blocks 30 and 34 as shown. While I do not limit myself to this, such arrangement has the advantage that a lug may thereby wedge against the body of the block to which it is attached to prevent its engaging face from slipping past the tube 16. The lugs or the like therefore do not have to extend between adjacent tube runs and the tube runs may be set on close centers in the direction transverse to the lengths of the superheater tubes. As shown in Fig. 2, the distance between the centers of adjacent superheater tubes is less than half that between centers of adjacent generating tubes so that nearly three times as many superheater tubes as generating tubes are shown in the direction transverse to the lengths of the superheater tubes.

Referring more particularly to Figs. 4 and 5, I have shown therein a spacer block 34A similar to the block 34 which embraces the tubes of section 24 of assembly 14. Block 34A has hanger lugs 44, 44 fastened thereto and arranged in engagement with certain of the tubes 12. The lower end of block 34A, however, is not connected to another spacer as in the case of block 34, but at its lower or inner end block 34A has a connecting ear 56 releasably bolted thereto which is fastened in turn to one of the tubes 16 of the unit 22 of serpentine assembly 14 by means of bodies of weld metal 58, 58. The position of block 34A is indicated on Fig. 1. Near block 34A on Fig. 1 but spaced therefrom somewhat in the direction longitudinally of tubes 16 are shown two blocks 30A and 32A respectively. Blocks 30A and 32A are similar to blocks 30 and 32 and are releasably bolted together as are blocks 30 and 32 in Figs. 2 and 3, block 30 embracing tubes of unit 20 and block 32 those of unit 22. Block 30A has hanger members 42 bolted thereto and is bolted to spacer member 32A, member 32A, however, instead of being bolted to a member 34, has at its inner end an ear 56 bolted thereon of the same form as the ear 56 of block 34A, and the ear 56 on block 32A is fixed to one of the tube runs 16 of unit 24 by bodies of weld metal 58 similar to those used with block 34A. It will be noted therefore that the ear 56 of block 32A bears against and is attached to one of the tube runs 16 which passes through the block 34A, while ear 56 on block 34A is fixed to a tube 16 which passes thru block 32A. Ears 56 of blocks 32A and 34A therefore overlap in the direction transverse to the tube runs 16 and thereby serve to connect the adjacent units 22 and 24 of assembly 14 rigidly together. The arrangement of Figs. 4 and 5 may therefore be used as a substitute for that of Figs. 2 and 3, but both arrangements have been illustrated on Fig. 1. In each arrangement of spacer members, the tube runs 16 of the sections of which assembly is composed are held in a given plane.

What I claim is:

1. A combined spacer and hanger means having a rigid portion provided with apertures therein to receive spaced tube runs, a hanger member having arcuate surfaces adapted to engage a boiler tube for supporting an element, releasable means for normally connecting said hanger member to said portion, ears having bolted connections to the spacer portion, and bodies of weld metal for securing said ears to said tube runs.

2. The combination of a combined spacer and hanger means for serpentine tubular assemblies having a plurality of rigid spacer block portions each having sockets therein to receive spaced tube runs, means to detachably secure said portions together, separable serpentine tubular units each having its individual tube runs seated in the sockets in one only of said portions, and hanger members releasably secured to certain of said spacer portions and having arcuate surfaces adapted to engage boiler tubes for supporting an assembly, said members arranged to wedge between the blocks and tubes.

3. The combination of a heating unit having spaced parallel tubular members arranged substantially in a given plane, a rigid spacer portion having sockets to receive certain of said tube runs, a hanger member having an arcuate surface adapted to engage a boiler tube for supporting a unit, releasable means for normally connecting said hanger member to said portion, an ear releasably connected to said portion, bodies of weld metal for securing said ear to one of said tube runs which is without said portion, a second spacer portion separated from said first portion in the direction of the length of said tube runs and having sockets embracing other of said tube runs one of which is identical with said tube run having the body of weld metal secured thereto, an ear releasably connected to said second spacer member, and another body of weld metal for securing said last mentioned ear to one of the tube runs lying in the sockets of said first spacer member.

4. The combination of a superheater assembly having a plurality of sections arranged for fluid flow therethru in parallel and each section having tube runs all of which are arranged substantially in a given plane, a rigid spacer block having socket in which are arranged the tube runs of one section of said assembly, a hanger member having an arcuate surface adapted to engage a boiler tube for supporting said assembly, releasable means for normally connecting said hanger member to said block, ears releasably connected to said block, bodies of weld metal for securing said ears to a tube run in a section of said assembly adjacent the one associated with said block, a second spacer block separated from said first block in the direction of the length of said tube runs and having sockets embracing the tube runs of a section of said assembly of which the one secured to said weld metal body is a part, a second ear releasably connected to said second spacer block, and other bodies of weld metal for securing said last mentioned ear to one of the tube runs lying in the socket of said first mentioned spacer block.

5. The combination of a superheater unit having a plurality of parallel tube runs arranged in a lane between parallel boiler tubes, said boiler tubes having at least twice the distance between them as said superheater tube runs, spacer blocks having apertures in which said runs are seated, supporting lugs at the sides of the said blocks and adapted to engage said tubes, and releasably pivoted connections between said lugs and said blocks, said lugs arranged to wedge between said boiler tubes and the blocks.

ROBERT P. THOMPSON.