

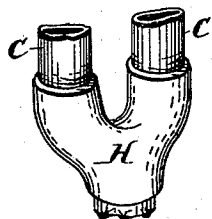
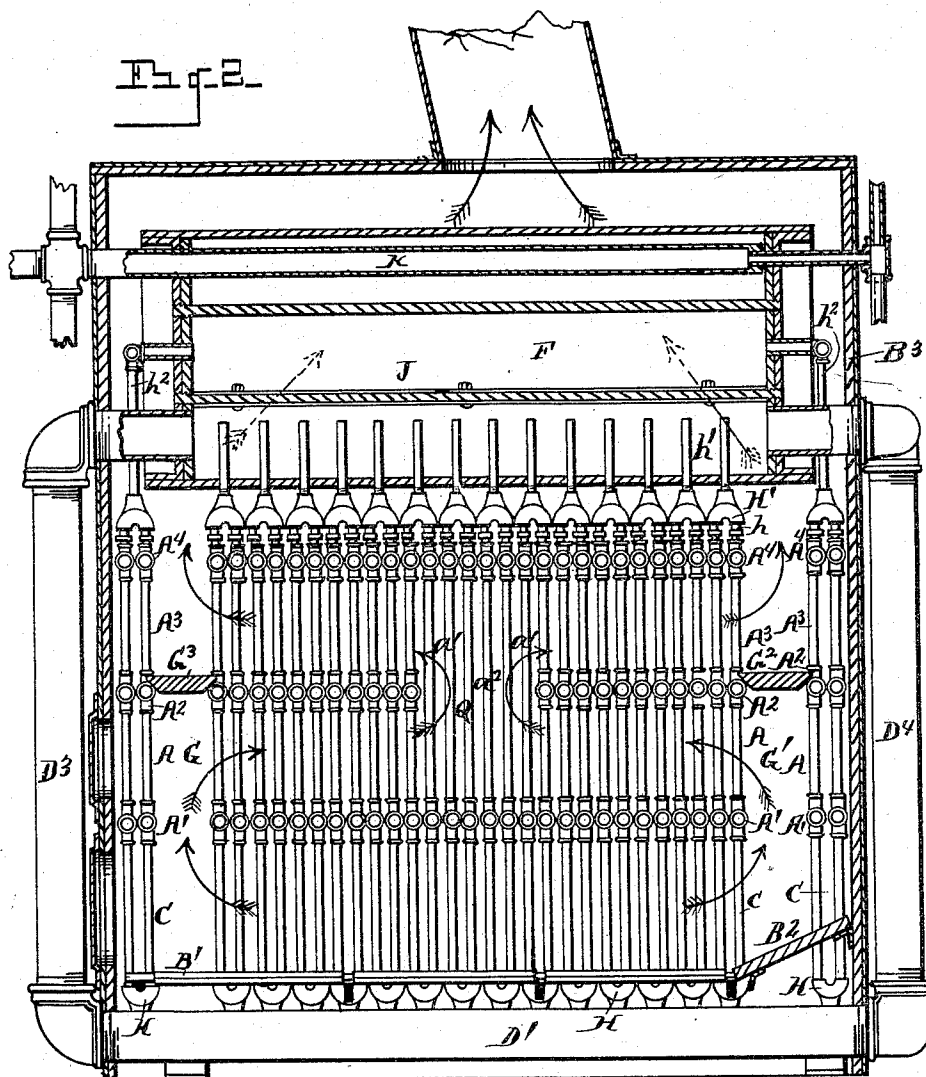
(No Model.)

3 Sheets—Sheet 2.

H. H. TAYLOR.
STEAM BOILER.

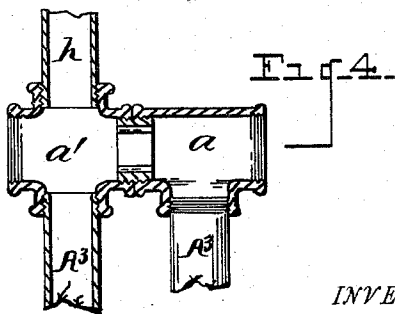
No. 541,897.

Patented July 2, 1895.



WITNESSES

O. J. Paruziger.
M. A. Martin.



INVENTOR

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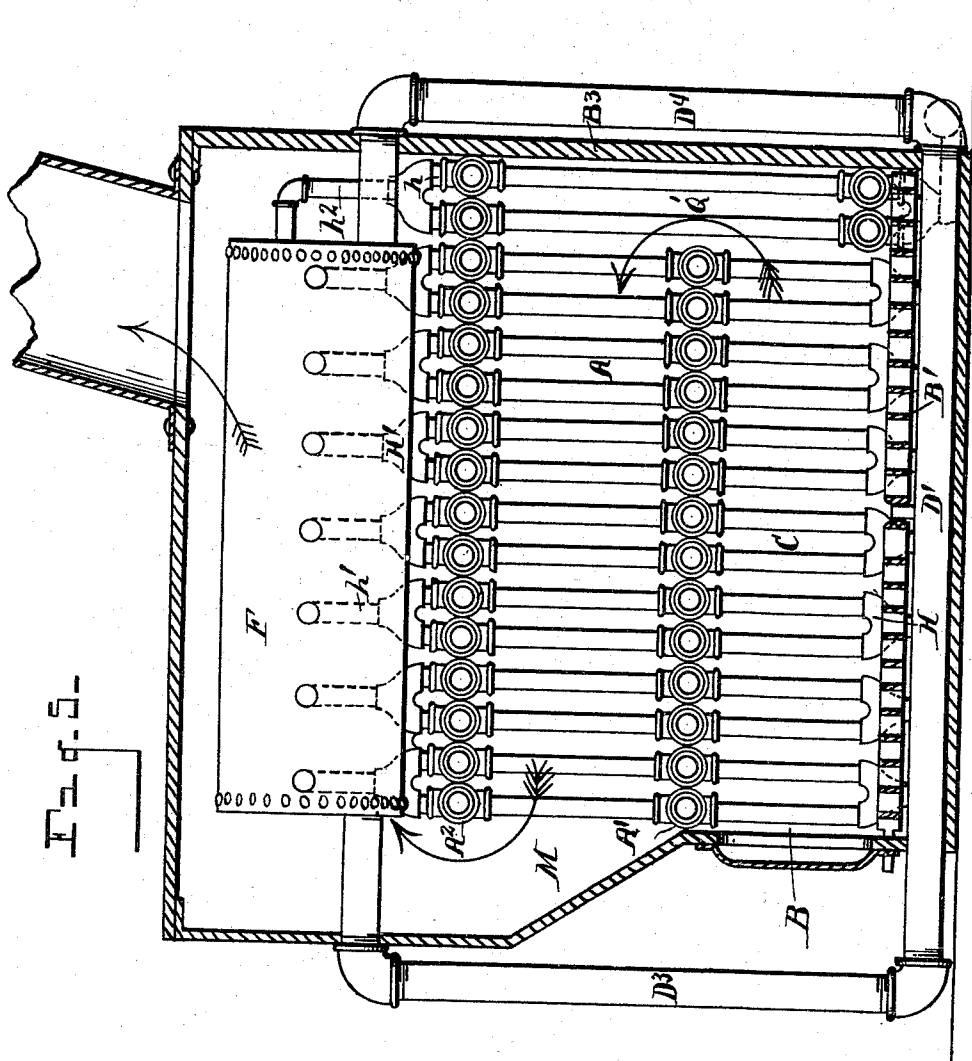
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UNITED STATES PATENT OFFICE.

HARRISON H. TAYLOR, OF DETROIT, MICHIGAN.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 541,897, dated July 2, 1895.

Application filed March 11, 1895. Serial No. 541,246. (No model.)

To all whom it may concern:

Be it known that I, HARRISON H. TAYLOR, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Steam-Boilers; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention is designed to provide an improved boiler of novel construction the same being more especially contemplated as an improvement upon a steam boiler embodied in an application for United States Letters Patent filed by me November 15, 1894, Serial No. 528,857.

My present invention consists of the construction, combination and arrangement hereinafter described and claimed and illustrated in the accompanying drawings, in which—

Figure 1 is an end elevation showing a portion of the structure in section. Fig. 2 is a cross section at right angles to the view shown in Fig. 1. Fig. 3 is a detail view of one of the Y-shaped couplings and its connections. Fig. 4 is a detail view in section showing the nipple connection of certain parts of the structure. Fig. 5 is a view similar to Fig. 2 showing a modification.

The purpose of my present invention embodies the construction of a steam boiler of greater heating capacity, as well as of a boiler of simple construction, whereby the heat will be utilized to the greatest degree in the generation of steam thereby.

I carry out my invention as follows:

In the drawings, A denotes a series of vertical pipes located immediately above the combustion chamber B of the boiler, said pipes uniting, in a manner hereinafter described in a manifold A' at their lower ends, the upper extremities of said pipes uniting, as hereinafter set forth, in a manifold A².

A³, Figs. 1 and 2, denotes an additional series of vertical pipes above the manifold A², connected into said manifold A² at their lower extremities, the upper end of said pipes A³ connected into a manifold A⁴.

The vertical pipes A, Fig. 5, and A, A³, Figs. 1 and 2, are arranged, respectively, in rows across the boiler above the combustion chamber, said pipes, together with their respective manifolds, constituting a "header" above the combustion chamber.

The vertical pipes A and A³ are connected at their extremities in a manner analogous to that shown and described in my above mentioned application. Thus with the upper ends of the pipes A³ are engaged a series of couplings, certain of said pipes being connected with T-shaped couplings *a*, other of said pipes being connected with cross-shaped couplings *a'*. These couplings are shown in detail in section in Fig. 4, wherein, also, adjacent ends of the couplings are connected by an interior revoluble nipple *a*², said nipple provided with right hand screw threads at one end and with left hand screw threads at the opposite end, screwed into the correspondingly threaded ends of the adjacent couplings. By this means it will be evident the two adjacent couplings may be drawn up tightly end to end, so that the corresponding pipes may be arranged near together, to form a large compact heating surface. These couplings I contemplate forming of malleable castings, a coupling being employed at each end of said pipes. The pipes A are connected at their two extremities in like manner, either with T-shaped couplings *a* or with cross-shaped couplings *a'*. The series of couplings *a* *a'* at the extremities of the pipes A and A³ thus connected form the corresponding manifolds A', A² and A³. The lower ends of the pipes A, and the upper ends of the pipes A³, are mainly connected by T-shaped couplings *a'* the couplings *a'* being employed in the manifold A' where pipes therebeneath lead thereinto, while the couplings *a'* are employed in the manifold A⁴ where pipes thereabove lead thereinto, as hereinafter explained.

C denotes a series of pipes at the sides of the combustion chamber, their upper ends being connected into corresponding manifolds A', there being obviously as many manifolds A', A² and A⁴ as there are rows of pipes A and A³. The pipes C lead into a lateral lower manifold D at the side of the combustion chamber.

E denotes a series of pipes led through the

combustion chamber connected at their upper ends into the manifold A' by means of couplings a' and at their lower ends into a corresponding manifold D', there being preferably two of such manifolds D' as indicated in Fig. 1, running lengthwise below the combustion chamber, and two of the lateral manifolds D also as indicated in Fig. 1. At one end of the boiler the manifolds D and D' are connected by a pipe D² indicated in dotted lines in said figure.

As shown in Figs. 1 and 2, the "header" is constructed of the vertical pipes A-A³ and their respective manifolds A', A² and A⁴, while in the modification shown in Fig. 5 the pipes A³ and the manifolds A⁴ are omitted, the header shown in said Fig. 5 simply employing the set of pipes A with their manifolds A' and A² at the top and bottom thereof. In the header illustrated in Figs. 1 and 2, the header is made of a double set of vertical pipes, where increased capacity is desired.

Above the header is a dome F into which the manifolds D' communicate at one end of the boiler through pipes D³, and at the opposite end of the boiler through pipes D⁴.

B' denotes the grate in the combustion chamber.

B² is a bridge wall.

B³ is the inclosing case.

Toward the front and rear of the boiler as embodied in Figs. 1 and 2, my invention contemplates spacing the tubes C, A and A³ apart, to form front and rear draft flues G and G'. Toward the middle of the boiler shown in Figs. 1 and 2 I omit a portion of the manifolds A², pipes a² leading from the manifolds A' directly to the manifolds A⁴, the pipes a² being practically an integral union of pipes A and A³ without any manifold A² intervening. By omitting some of the manifolds A² toward the middle of the boiler, as above stated, I provide practically a draft passage Q for the passage of the products of combustion there-through.

Adjacent to the manifolds A² in the flues G G', I locate baffle plates G² and G³, by which the draft is turned centrally inward toward the draft passage Q. I contemplate locating the manifolds A' so closely together as to compel the products of combustion to pass under the flues G and G'. So also the manifolds A² are located in like manner so as to compel the products of combustion to pass inward from the flues G and G' to said draft passage Q. The manifolds A⁴ are also located so closely together as to compel the products of combustion passing outward thereunder from the draft passage Q to the flues G G' as indicated by the arrows. In this manner, and by this construction the products of combustion are compelled to traverse through the pipes crosswise, or at right angles to the pipes so as to bring the heat into contact with the pipes and manifolds to utilize the heat to the fullest possible degree, thereby increasing the

heating capacity of the boiler in large measure, and also permitting it to be constructed in the most compact form. The upright pipes obstruct and hold the heat sufficiently to allow the heat to be thoroughly taken up by the water in the pipes. The same principle is carried out, so far as certain features of construction are concerned, in the modification shown in Fig. 5. In the latter figure provision for a single return of the draft is disclosed, while in Figs. 1 and 2 provision is made for a double return of the draft as shown in Fig. 5. A portion of the manifolds A' to the rear end of the boiler is omitted forming a draft passage Q', analogous to the passage Q of Figs. 1 and 2. The manifolds A² being close together direct the draft forward as indicated by the arrows. In each case a horizontal return flue is effected by the arrangement of the manifolds. In each of the modifications illustrated in the drawings, while in Figs. 1 and 2 an additional horizontal return flue is provided.

The pipes C and E are connected into corresponding manifolds by means of Y-shaped couplings H connecting two adjacent pipes into the manifold. The use of said couplings, it is evident, dispenses with the necessity of tapping the manifolds as much as would otherwise be required. The upper manifolds of the header are connected into the dome F also by means of Y-shaped couplings H', a single coupling connecting two adjacent upper manifolds with the dome, by intervening pipes h leading into the manifolds and a pipe h' leading from the coupling into the dome.

The upper manifolds directly beneath the dome, I prefer to lead into the base of the dome as shown, the pipes h' projecting upward therewithin above any condensed water there may be within the dome. The upper manifolds, not directly beneath the dome, F, I prefer to lead into the dome at the ends thereof as by the connecting pipe h² leading from the corresponding couplings.

I prefer to locate within the dome, above the pipes h' a partition J to divert the steam laterally therewithin. The pipes D³ and D⁴ preferably lead into the dome beneath said partition.

K is a dry pipe.

In the form shown in Fig. 5 there is but one vertical flue at the end of the boiler, outside the header, indicated by the letter M analogous to one of the flues G G'. Shown in Fig. 2.

What I claim as my invention is—

1. In a steam boiler, the combination of vertical pipes, and manifolds having a screw threaded connection with said pipes at the upper and lower ends thereof and communicating therewith, said manifolds located closely together forming a horizontal return draft flue therebetween, substantially as set forth.

2. In a steam boiler provided with a vertical flue at one end thereof, the combination

of vertical pipes, and manifolds having a screw threaded connection with said pipes at the upper and lower ends thereof and communicating therewith, said manifolds located closely together forming an intermediate horizontal draft flue communicating with said vertical flue, substantially as set forth.

3. In a steam boiler, a series of vertical pipes having manifolds at the extremities thereof constructed of T-shaped and cross-shaped couplings, the adjacent manifolds at the top and bottom of the pipes arranged in close proximity to compel the products of combustion to pass therebetween, substantially as set forth.

4. In a steam boiler, a series of vertical pipes A and A³, a series of manifolds therebetween, and at the lower extremities of the pipes A and at the upper extremities of the pipes A³, said manifolds made of T-shaped and cross-shaped couplings, the adjacent manifolds closed therebetween forming intermediate draft flues, substantially as set forth.

5. In a steam boiler, a series of vertical pipes having sets of manifolds at the upper and lower ends thereof, each set of manifolds located closely together and arranged to compel the products of combustion to pass about one set of said manifolds and to return under the other set of manifolds, substantially as set forth.

6. In a steam boiler, the combination of pipes A, sets of manifolds A' A² into which the extremities of said pipes are connected, a set of manifolds A⁴, pipes A³ connected into the manifolds A² A⁴, said pipes and manifolds arranged to form a "header" above the combustion chamber of the boiler, each set of

manifolds closed therebetween, substantially as and for the purpose set forth.

7. In a steam boiler, the combination of pipes A, manifolds A' A² into which the extremities of said pipes are connected, a manifold A⁴, pipes A³ connected into the manifolds A² A⁴, flues G G' toward the ends of the boiler, means to close said flues adjacent to the manifolds A² and a draft passage toward the middle of the boiler between the manifolds A², substantially as set forth.

8. In a steam boiler, a header above the combustion chamber, draft flues at the ends of the boiler, a draft passage centrally of the header, means to divert the draft from said flues through said draft passage, and thence outward, substantially as set forth.

9. In a steam boiler, the combination of pipes A A³ above the combustion chamber, a set of manifolds intermediate the adjacent ends of said pipes, lower manifolds at the base of the pipes A, upper manifolds at the upper ends of the pipes A³, manifolds below the combustion chamber, pipes connecting the manifolds above and below the combustion chamber, a dome, Y-shaped couplings connecting the upper manifolds into the steam dome, and the lower manifolds with the adjacent pipes, and pipes connecting the lower manifolds into the dome, said lower and upper manifolds closed therebetween, substantially as and for the purpose set forth.

In testimony whereof I sign this specification in the presence of two witnesses.

HARRISON H. TAYLOR.

Witnesses:

N. S. WRIGHT,

MARY A. MARTIN.