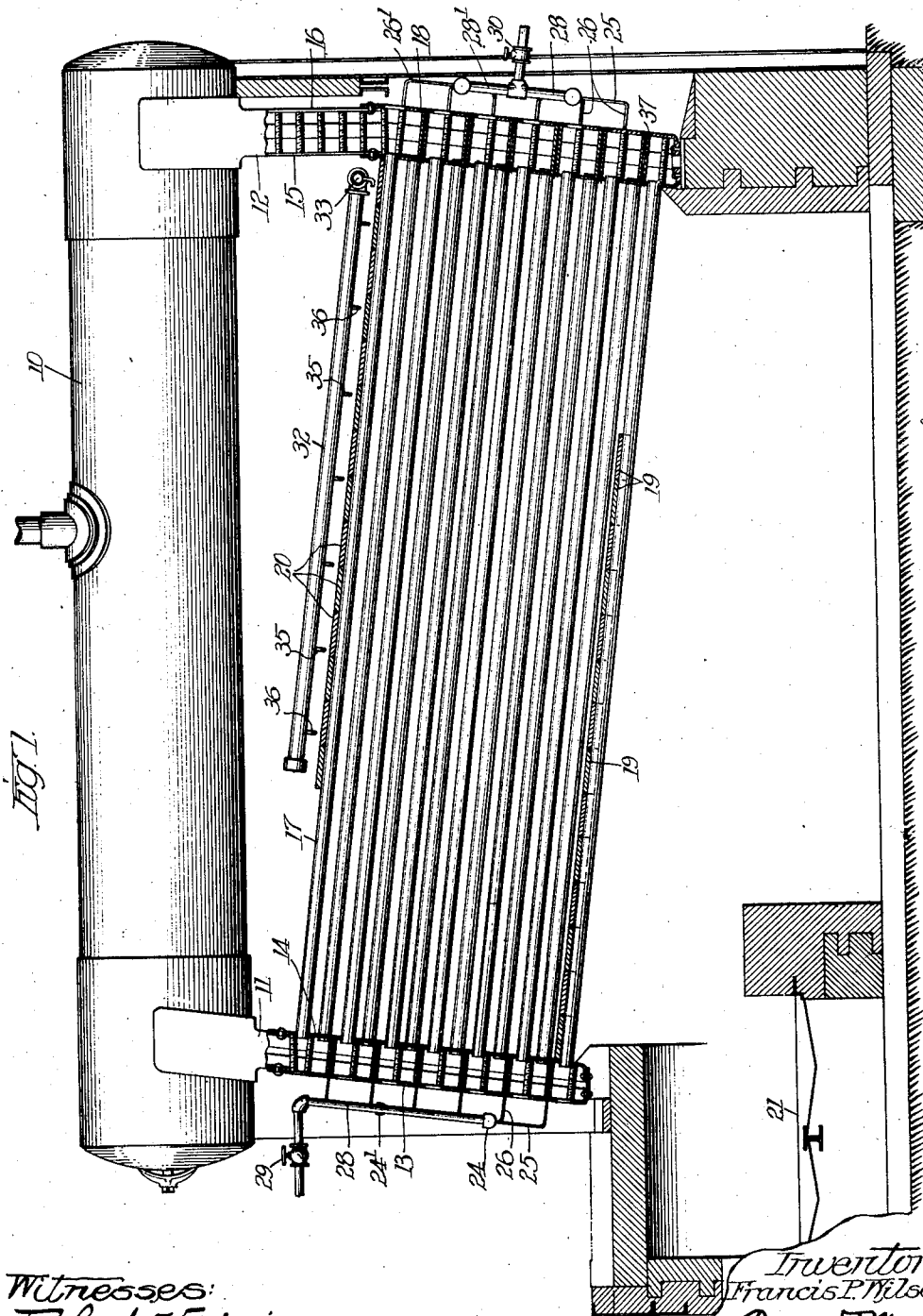


F. P. WILSON.
BOILER TUBE CLEANER.
APPLICATION FILED FEB. 19, 1912.

1,062,941.

Patented May 27, 1913.

3 SHEETS—SHEET 1.



Witnesses:
Robert H. Weir
W. H. Grossdorff

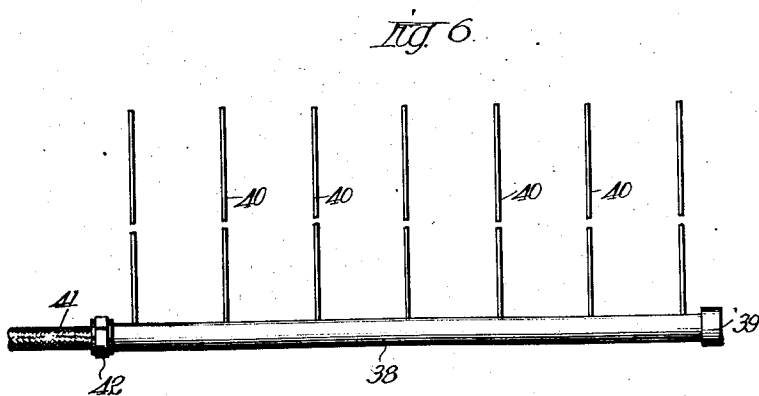
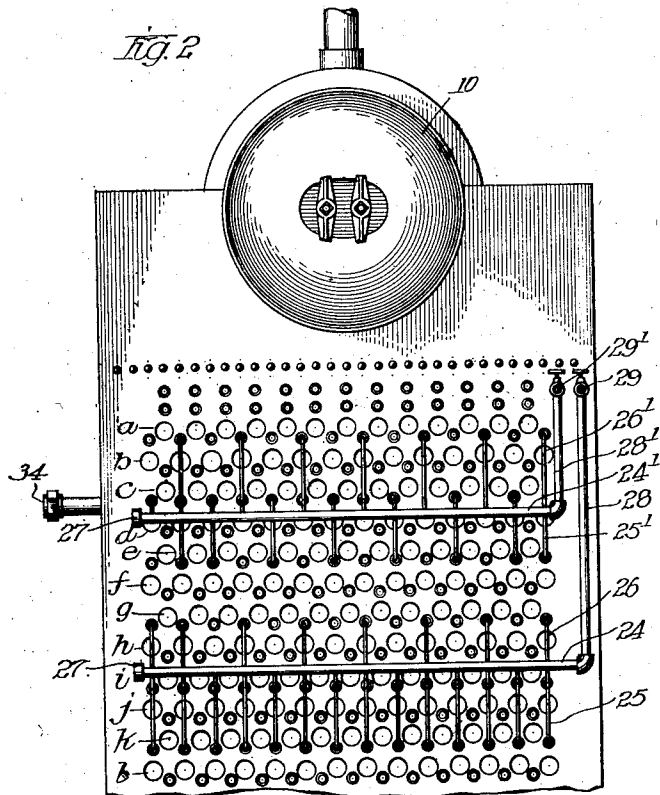
Inventor:
Francis P. Wilson
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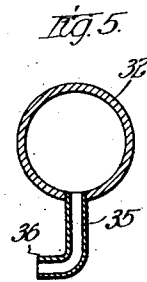


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3 SHEETS—SHEET 3.



Robert H. Weir
W. H. Gersdorff

By Jonei Bain May
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UNITED STATES PATENT OFFICE.

FRANCIS P. WILSON, OF CHICAGO, ILLINOIS.

BOILER-TUBE CLEANER.

1,062,941.

Specification of Letters Patent.

Patented May 27, 1913.

Application filed February 19, 1912. Serial No. 678,618.

To all whom it may concern:

Be it known that I, FRANCIS P. WILSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Boiler-Tube Cleaners, of which the following is a specification.

My invention relates to improvements in boiler tube cleaners and has special reference to devices of this character that are adapted for application to water tube boilers.

Steam boilers wherein the hot gases of combustion surround, and come in contact with the outer surfaces of the water carrying tubes there is present a deposit of ashes, or soot, upon the upper surfaces of the tube, especially when they occupy more or less horizontal positions, as usual with boilers of this type. Such deposits are insulators, to a greater or less degree, and, therefore, their presence decreases the heating efficiency of the water carrying tubes by substantially decreasing the surface thereof. Therefore, in the practical operation of such boilers, it is very desirable that the deposits upon the tubes should be removed at frequent intervals. To accomplish this result it is necessary to provide a means, the presence of which will not interfere with the normal operation of the boiler, and which may easily and quickly be brought into operation.

The object of my invention is the provision of a means whereby the results above mentioned may be conveniently and thoroughly accomplished.

Other and further objects of my invention will become readily apparent to persons skilled in the art from a consideration of the following description when taken in conjunction with the accompanying drawings, wherein—

Figure 1 is a side elevation, partly in section, of a water tube boiler showing my invention applied thereto; Fig. 2 is a front end view of the boiler. Fig. 3 is a rear view of the boiler; Fig. 4 is an enlarged fragmentary detail of a portion of the header of the boiler showing the manner of introducing my blowing device through the hollow stay bolts of the header; Fig. 5 is an enlarged sectional view; and Fig. 6 is a plan view of a portable blowing head or manifold having tubes attached thereto.

In all the figures the same reference characters are employed to indicate the same parts.

I have shown a water tube boiler of a well known type to illustrate the application of my invention, wherein 10 is a steam and water drum of the boiler, 11 and 12 are depending water legs, or headers, connected with the said drum at the front and rear ends thereof, respectively. The headers are composed of front and rear walls 13—14 and 15—16 respectively.

To the inner walls of the header are connected rows and tiers of water tubes 17. In Fig. 2 I have indicated the horizontal rows of water tubes in vertical sequence by means of lower case letters *a* to *l* inclusive for the purpose of identifying the respective rows.

A plurality of hollow stay bolts are employed to connect the boundary walls of the depending water legs, or headers, as usual in such structures. These stay bolts are transversely arranged in horizontal rows and in vertical tiers, corresponding substantially with the arrangement of the water tubes. It will be observed that a stay bolt is interposed between two adjacent tubes in the same row and that a stay bolt of a given row is practically immediately above a tube of the row below. For instance a stay bolt is shown between the first two tubes on the left of the row *a*, of Fig. 2, and immediately above the second tube of the row *b*, such arrangement being similarly maintained throughout the entire boiler structure.

Baffle plates 19 overlie the bottom row of tubes *l* as shown in Fig. 1 as usual in such boiler constructions for the purpose of diverting heated gases of combustion, and similar baffle plates 20, overlie the upper row of tubes *a*, for the same purpose.

21 is a furnace by means of which the said boiler is heated.

The boiler, so far as described, is of the usual type and forms no part *per se* of my invention.

My invention consists of an attachment to a boiler and includes a manifold or pipe 24 to which is connected a series of smaller tubes or nozzles 25 and 26. These tubes communicate with the interior of the pipe and extend laterally on either side in substantially the same plane and are then bent

at right angles for insertion into the hollow stay bolts that are located in rows across the boiler at uniform distances apart.

By reference to Fig. 2 it will be observed that there is a tube 25 in each of the hollow stay bolts that are located in a row immediately below the row of water tubes *k*. The reasons for placing these blowing tubes so close together in this particular row of stay bolts is that they are immediately above the lower baffle plate 19, so that when steam or air under pressure is admitted into the manifold 24 the dust will be blown off the surface of the baffle plate across its entire width.

A vertical pipe 28 controlled by globe valve 29 is connected to the manifold 24 and the said valve 29 is connected to the source of steam or air supply.

The structure which I have just described is located on the lower part of Fig. 2 which shows the front end of the boiler. A similar structure is located immediately thereabove and the parts thereof are indicated by similar reference characters with the addition of the exponent prime ([']). In the rear of the boiler a similar structure is shown, the parts of which I have indicated by similar reference characters. In this instance the two devices are controlled by the same valve 30, although it is evident separate pipes and valves may be employed for controlling each of these structures independently.

It will be observed by comparing Figs. 2 and 3 that the blowing tubes 23 are inserted into the stay bolts in the respective ends of the boiler in such manner that no two opposite stay bolts have each included therein a tube, so that by this means the ashes and soot deposited may be blown from each of the water tubes of the boiler construction.

When steam or compressed air is admitted into the manifold 24, at each end of the boiler at the same time, the ashes that are deposited on the water tubes are given such a whirl within the space between said tubes that they are immediately taken up by the draft of the boiler and carried out through the chimney and therefore are not redeposited on the other portions of the structure.

For cleaning the upper baffle plate 20 I provide a manifold composed of three pipes 32, 32' and 33 the two former of which extend lengthwise of the baffle plate and the latter across the rear end. Into each of the pipes are connected tubes 35 outturned, as at 36, and located at sufficiently frequent intervals to produce an entire complete sweep over the surface of the baffle plate. The ends 36, of the tubes 35, are located just above the upper surface of the baffle plate so that the projected cleaning medium may have a clear sweep across the entire surface and produce a thorough cleaning operation.

A union 34 is a means by which the pipes

may be connected to a source of air or steam supply.

In the event that the lower baffle plate 19 may not be cleaned the full extent of its length by the application of the blower at the front end of the boiler I have provided a special portable device to be inserted in the row of hollow stay bolts which row of stay bolts I have indicated by 37 at the bottom of the header at the rear of the boiler. This device consists of a manifold pipe 38 provided with a cap 39 and having a series of straight tubes 40 connected at one side thereof at intervals equal the distance between the said stay bolts. These tubes are equal in length to the distance between the inner end of the baffle plate 19, and the rear end of the boiler, at the outer walls of the rear header, so that when the device is inserted in the row of stay bolts 37 the ends thereof will be in close proximity to the inner end of the lower baffle plate, and compressed air directed into the tubes 40, and projected over the lower baffle plate will clean off that portion of the plate that may be left uncleared by the blower at the front end of the boiler.

A hose 41 connected on to the manifold 38 and 42 is designed for connection with a source of air supply or steam supply, the said hose being flexible so that the device may be easily handled. After it has been used in the manner described it is withdrawn from the row of stay bolts. It remains therein only as long as it is being used for the purpose described.

The tubes 25 and 26 are reamed to provide tapered openings at their ends, as at 43, to the greatest practical extent that will cause the air or steam projected therefrom to spread out and cover a larger area than it would otherwise cover if it were projected directly from the original diameter of the interior of the tube without the reamed end. The reamed end of the tubes operate to cause a spreading of the projected medium to cover a large area of the water tubes, but prevents the impingement of the medium on the water tubes near the ends of the manifold tubes and thereby saves the water tubes from pitting.

The projection of steam, or air, under pressure from the blowers, at both ends of the boiler, at the same time, produces a novel and advantageous effect on the objectionable deposits upon the water tubes and causes the said deposits to be carried out by the draft of the boiler as heretofore stated, thereby entirely cleaning the parts and removing the soot or ashes that were deposited thereon.

While I have herein described in some detail an embodiment of my invention it will be evident that changes may be made within the scope of the claims without departing therefrom.

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

1. In a device of the character described, the combination of a water tube boiler having opposite double wall headers each provided with rows of hollow stay bolts communicating with the boiler spaces between the water tubes of the boiler, and a manifold associated with each said header, each manifold comprising a pipe connected to a source of fluid under pressure and a series of nozzle tubes extending from said pipe and disposed in rows for permanent arrangement in alternate rows of hollow stay bolts at the respective end of the boiler, the rows of nozzle tubes at one end entering said boiler spaces left vacant by the alternate rows of nozzle tubes at the other end, whereby simultaneous operation of all said rows of nozzle tubes, so staggeringly arranged, results in the formation of whirls within said spaces as and for the purposes described.

2. The combination with a boiler having opposite double-wall headers provided with rows of hollow stay bolts communicating with the boiler spaces between the water tubes in the boiler, and baffle plates providing non-alining openings at opposite ends of said boiler, manifold nozzle tubes permanently arranged in staggering relation in

alternate rows of hollow stay bolts whereby each said boiler space has a row of manifold tubes associated therewith at one end and the adjacent spaces at the opposite end thereof, each said nozzle tube terminating at substantially the inner edge of the surrounding hollow stay bolts, and a nozzle having a series of tubes for insertion in a row of hollow stay bolts, said last mentioned tubes being of a length to extend from the manifold through the hollow stay bolts and into the associated boiler spaces to a point beyond the space left at that end by the baffle plates, and each extending in a straight line from its manifold, whereby said row of tubes may be removed from any row of hollow stay bolts and inserted in any other row of hollow stay bolts in either header of the boiler not occupied by said permanently-inserted alternately-arranged tubes, and a flexible tube connection for said removable manifold permitting such removal of the tubes and insertion thereof in any other unoccupied row of hollow stay bolts.

In testimony whereof I hereunto set my hand in the presence of two witnesses.

FRANCIS P. WILSON.

In the presence of—

W. LINN ALLEN,

MARY F. ALLEN.