

CORBIN AND GOODRICH
AND
THE BOILERS OF MR. CAMPBELL.

By W. BARNET LE VAN.

The December JOURNAL OF THE FRANKLIN INSTITUTE contains an article on "Steam Boiler Explosions," in which I am referred to as the expert employed by Mr. George Campbell to design boilers for his mill at 21st and Washington avenue.

On page 399 of said JOURNAL, commencing at 14th line from the top, the following will be found :

"We are very glad that he (Mr. Nystrom) has seen fit to refer to his report on the boilers built for Mr. George Campbell, as events have transpired subsequent to that report which show, beyond question, what the result of his inspection led to. The boilers were built by the Baldwin Locomotive Works, according to specifications furnished by Mr. W. Barnet Le Van, who was employed by Mr. Campbell as an expert for that purpose. The boilers were of the type known as horizontal tubular boilers, the lower cylinders being 54 inches in diameter and containing 50 4-inch tubes; the upper cylinders were 30 inches in diameter, and they were connected by two 12-inch necks. When the boilers were finished and our inspectors were called in, preparatory to insurance, it was found that the upper row of tubes in the lower boiler came within $8\frac{1}{2}$ inches of the top. *Allowing for 4 inches of water above the tubes, the surface for disengaging steam was so small that it was apparent to us that nothing could keep the water at an even height, or prevent it from being driven altogether out of the lower boiler at times.* We immediately declined to insure the boilers, and so informed Mr. Campbell, who, naturally desiring further light upon the subject, referred the matter to various experts, and among those so consulted was Mr. Nystrom."

On page 400, fifth line from bottom, and on page 401, is the following :

"Now, what was the result? Encouraged by such teaching as the above, Mr. Campbell was induced to put in two of the boilers at first constructed under Mr. Le Van's specifications, and when they were

fired up the effect was precisely that foretold by our inspector, *and the water, instead of showing a variation of an inch, as stated by Mr. N., a 12-inch glass gauge was not long enough to keep track of it, and no amount of persuasion could keep the water in the lower boiler when fired as originally intended. After several ineffectual attempts to remedy the fatal defects, the boilers were placed in the hands of the Hartford Boiler Insurance Company for such reconstruction as we thought necessary to make them work satisfactorily.*

“At our direction the Le Van boilers were entirely overhauled, changing their length to 18-feet instead of 14, and putting in 28 4½-inch tubes, leaving a clear space of 18 inches from top of tubes to shell of boiler. We also enlarged the necks, to save putting a man-hole on the top of the lower boiler. It was at this point that we stipulated what thickness of material should be used in the necks.”

Portions of the extracts are printed in italics for the purpose of easy reference.

The following statement sets forth the exact facts in the above matter:

In the fall of 1878 Mr. George Campbell invited me to furnish him with a working drawing of boilers for his mill at 21st and Washington avenue, in this city. The space to receive them at that time was 17 feet in width by 18 feet in length, and the power required was 300 horse power. On plotting, I found that for three boilers the largest diameter that could be employed in the space was 54 inches, and the greatest length 14 feet, and to develop 100 horses through *his* Corliss engine each boiler would require 50 flues four inches in diameter.

Plans were submitted by others in addition to those of myself.

On or about the first of May, 1879, Mr. Campbell informed me he had examined all the plans of boilers submitted, and that Mr. Pike, the inspector of the Hartford Boiler Insurance Company, had examined them, and he had concluded to adopt the plan of boiler furnished by me, and Mr. Campbell requested me to draw up specifications so that he might have estimates for building them, subject to the inspection of Mr. Pike.

Several bids were received from prominent boiler makers, and after accepting my proposition the boilers were ordered to be built by the Baldwin Locomotive Works.

They immediately proceeded to build them, and during their construction the Hartford Boiler Insurance Company were notified, so

that their Mr. Pike might inspect them in detail. Mr. Pike met me at the Baldwin Locomotive Works several times during their construction, and when the first boiler was ready to receive the water test, Mr. Pike was again notified, and was present, as he also was when the first and second boilers were under pressure of both water and steam at Baldwin Locomotive Works.

No objection was made by him up to this time as to material, workmanship or design.

Before the third boiler was ready for a water test, the Wilt & Son's boiler explosion occurred, and the writer was subpoenaed as an expert by the coroner of this city to testify in reference to the cause of this explosion. The boiler at Wilt & Son's mill was insured by the Hartford Boiler Insurance Company, and was under Mr. Pike's inspection.

In July, 1879, the third boiler was finished, and Mr. Pike was again notified to be present, *and at this trial he for the first time informed me that he could not insure these boilers* for (in substance) the following reasons:

1st. That they did not have sufficient outlet from the flue shell of the boiler to the steam drum; that two 12-inch necks were not of sufficient capacity for the proper discharge of the steam generated; that these necks should have been *four* in number, each 12 inch diameter, in place of two as now constructed.

2d. That there was not sufficient surface of water for disengaging of the steam, and that *the water would be driven out of the lower boiler into the steam drum*, and that therefore *they would not be safe to use as at present constructed*, and that before he would consent to *insure them he would insist on the two top rows of flues being taken out.*

This was a complete surprise to me, as no objections to the mode of construction had been made by him or any other person prior to this. I at once consulted with several prominent boiler engineers, none of whom agreed in opinion with Mr. Pike.

After a few days I again met Mr. Pike, and then he informed me he would withdraw his objection in regard to the number of necks if I would increase their diameter to 16 inches in place of 12 inches as now constructed, but he still insisted on the removal of the two top rows of flues as before stated; that he had written to the home office in regard to these boilers, and that Mr. Allen, the President, in reply had left the matter entirely in his discretion to do as he thought fit, and therefore that the above was his ultimatum, as his reputation was

at stake, and that the Company *would rather lose the insurance than take a risk on the boilers as then constructed.*

Mr. Campbell, after hearing the opinion of other engineers coinciding with mine, said he was satisfied, but would like to have them examined on his own account, in which wish I concurred.

He also requested me to furnish him with the names of a number of engineers who were experts in this matter, from which he could select one or two to give him a written opinion, which I did.

From the names so furnished he selected Messrs. Edward Longstreth and John W. Nystrom, and on their written report he ordered the two boilers now finished to be erected.

After being erected the Hartford Boiler Insurance Company's inspector, Mr. Pike, refused to pass them. Mr. John Overn, the City's Boiler Inspector, was then notified and the above facts were related to him and he at once inspected them in person, and authorized Mr. Campbell to have them put in operation.

When first fired up they foamed badly on account of the grease and oil left on their surfaces in the course of manufacture. Foaming occurs more or less in all new boilers.

During their first steaming and from the necessity of keeping the mill in full operation, consequent upon extensive alterations, these boilers were forced over their capacity, as they had at times to drive one-half the work of the mill and the shafting also, the power required to do which was never less than 225 horse-power, and at times 250 ; whilst the boilers were designed for only 100 horse-power each. This will account for the variation of the water-level referred to.

When the boilers first ordered, were nearly completed Mr. Campbell enlarged the boiler room so that it could then accommodate longer boilers than 14 feet ; he also increased the number ordered, first to four, then to five, in place of three as at first contemplated.

During Mr. Campbell's absence from the city the Hartford Boiler Insurance Company induced the Superintendent of the mill to change the other three boilers (one of which was finished but not erected) to 18 feet in length instead of 14, and reduce the number of flues to 28 four and one-half inch flues, by which alteration the power of the boilers was reduced 20 per cent., and also to increase the diameter of the necks to 16 inches diameter in place of 12 inches, thereby decreasing the strength of the boilers about 25 per cent.

When the Superintendent directed a change to be made in the third

and fourth boilers, which were completed but not erected in brick work, I protested, but without avail. Directions having been given to make the change, I then desired that the necks should be made of metal one-half inch thick, in order to compensate for the decrease of strength caused by cutting holes 18 inches in diameter for the accommodating of the larger necks ordered to be put in. This was consented to by Mr. Pike and the Superintendent of the mill at the time the order was given to the Baldwin Locomotive Works. The next morning Mr. Pike called at Baldwin's and *changed* the order from *one-half inch in thickness for the necks to three-eighths in thickness*, stating that if *half inch* in thickness was used he would not insure the boilers.

This alteration of the order I was not aware of until several days had elapsed; the plates had been ordered by telegraph to be made at the Otis Steel Works, Cleveland, Ohio, and were probably completed.

The assertions made by Corbin and Goodrich, Agents of Hartford Boiler Insurance Company, in their communication in the December number of the JOURNAL OF THE FRANKLIN INSTITUTE, herein quoted from pages 399, 400 and 401, are not true, and are calculated to injure the writer by the false impressions they tend to produce, making it proper for me to set forth the facts as they actually occurred.

The two boilers first built were constructed *in exact accordance with my designs, and without any alterations*; they were set in brick work in the boiler room in the mill, and then fired up and put into service.

These boilers are still in service, and have been since September 5th, 1879, unchanged in construction, and giving entire satisfaction.

Moreover, I have been informed by Mr. Campbell that *they have been recently insured* by the Hartford Boiler Insurance Company, notwithstanding the statements that have been published by that company in this journal.

Furthermore, I have been informed by the engineer of Mr. Campbell, in the presence of Mr. John Overn (Chief Boiler Inspector of this City) and of Mr. Edward Longstreth, of the Baldwin Locomotive Works, that he had no trouble whatever in maintaining a steady water-level in these boilers, and that when the engine was stopped suddenly the water never fell in the glass water gauge over *one inch*.

To-day, December 24th, 1879, I met Mr. Pike at Mr. Campbell's mill, and he corroborated Mr. Campbell's statement in regard to insur-

ing the two first boilers erected by me, and which they had at first refused to insure.

In conclusion, I desire to call attention to the quotations from the December JOURNAL, which I have italicized, and to show the inconsistency of the statements of the agents of the Hartford Boiler Insurance Company, regarding the boilers in question, with the action of the company in insuring the same.

THE WIRE BOOK SEWING MACHINE.

By H. BILGRAM, M.E.

Read before the Franklin Institute at its meeting, October 15th, 1879.

The most important step forward that has lately been made in book binding is undoubtedly the substitution of wire for thread. A machine for sewing books with wire was recently exhibited at a meeting of the Franklin Institute, where several books were sewed before the audience.

The principle of this machine consists in producing a number of U-shaped wire staples, which are driven *from the inside* of each section of the book through the back and through one wide or several narrow bands of a strong linen or cotton fabric, whereupon the ends projecting through the back are clinched over, and thus a firm connection between the sheets of the section themselves and the band or bands covering the back of the book is produced. The machine fastens a section at each revolution of the main shaft, and can be run at 40 to 43 revolutions per minute. The book sections are fed by the operator, partly opened, upon a table which, by an oscillating motion, brings the sheet in position to be sewed. By an adjustable downward feed of the table on which the book is sewed, the sections can be sewed tight or loose, to suit the degree of "backing" in the subsequent forwarding of the book.

The principal merits of this mode of binding books are strength, durability and flexibility, besides the saving of labor, as an operator can turn out as much work on one of these machines as from five to eight operators can do by hand. Greater strength is given by the several sheets of each section being clamped firmly between the back and the clinched legs of the wire staple while the thread in thread-