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Artificial Respiration.

The *Medical Press and Circular*, 1880, informs us that in a recent communication to the French Academy, Professor Fort raises again the question of premature interments. One fact he mentions is, that he was enabled to restore to life a child three years old, by practicing artificial respiration on it four hours, commencing three hours and a half after apparent death. Another case was communicated to him by Dr. Fournol, of Billancourt, who, in July, 1878, reanimated a nearly drowned person after four hours of artificial respiration. This person had been in the water ten minutes, and the doctor arrived one hour after asphyxia. Professor Fort insists also on the utility of artificial respiration in cases of poisoning, in order to eliminate the poisons from the lungs and glands. The length of time it is desirable to practice artificial respiration in any case of apparent death from asphyxia, Professor Fort has not yet determined, but his general conclusion is that it should be maintained perseveringly for several hours.

The Efficiency of the Water Trap.

A contemporary publishes an important experimental investigation by Dr. Neil Carmichael concerning the trap and water closet system, and their relation to sewage products, gaseous and others. As the result of this investigation, Dr. Carmichael came to the conclusion that an efficient water trap excludes soil pipe atmosphere to such an extent that what escapes through the water is so little in amount, and so purified by filtration, as to be perfectly harmless. The water trap, he further concludes, stops entirely the passage of all germs and particles from the air of the soil pipe, including the specific germs or contagia of disease, which, so far as is known, are particulate. He thus traverses entirely the belief so largely entertained that the water of a trap, however perfect in arrangement, will absorb the air of the soil pipe until saturated, and then give it off harmfully on the house side. He would rehabilitate the old faith in the sufficiency of the water to insure safety, and he would refer the harm from traps to their imperfect sealing, or to various deteriorations in the structure of the water closet or soil pipe which permit direct communication between the air of a house and the air of the soil pipe. The series of experiments on which Dr. Carmichael has founded these conclusions are exceedingly ingenious, and would certainly appear to justify them, but we doubt whether he has been sufficiently careful in indicating the conditions under which the safety of the water trap can be secured.—*Lancet.*

THE BABCOCK & WILCOX WATER TUBE BOILER.

Efficiency, economy in the use of fuel, and safety are qualities which are absolutely requisite in a boiler in these days of the wide application of steam, and notwithstanding the care taken in the construction and use of shell boilers for either high or low pressure, neither the user nor the people in the vicinity of them can feel any degree of safety.

The boiler shown in our illustrations is not only one of the most economical and efficient, but it is absolutely safe from destructive explosion at any pressure, and possesses, in addition, the quality of lightness and portability of parts, a very important feature when the matter of transportation is considered.

Our front page illustration represents a nest of four boilers of the Babcock & Wilcox type. These boilers were recently constructed, and are now in successful operation at the Standard Oil Company's Refinery, Greenpoint, L. I. The side elevation gives an excellent idea of the construction of the boiler and furnace, and the relative arrangement of the various parts.

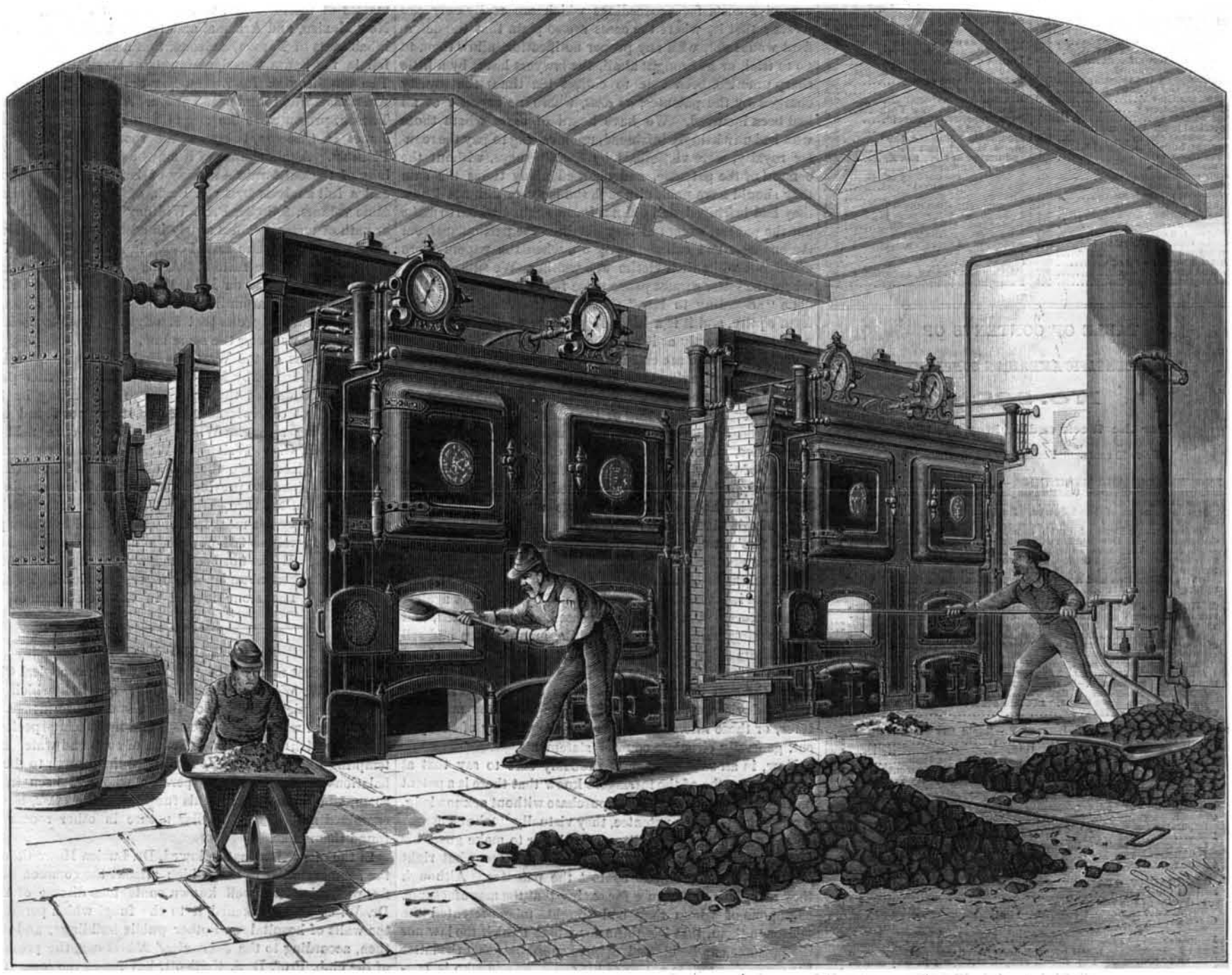
It will be seen that the construction of the boiler is radically different from the ordinary flue boiler, in which the water surrounds the tubes and flues, as in this boiler the order of things is reversed; the water circulates through the tubes and two drums, the exterior surface of which affords a very large and effective heating surface.

This boiler is composed of lap-welded wrought iron tubes, placed in an inclined position, and connected with each other, and with a horizontal steam and water drum, by vertical passages at each end, while a mud drum connects the tubes at the rear and lowest point in the boiler.

The end connections are in one piece for each vertical row of tubes, and are of such form that the tubes are "staggered" (or so placed that each horizontal row comes over the spaces in the previous row). The holes are accurately sized, and the tubes fixed therein by an expander. These are connected with the water drum, and the mud drum also, by short tubes expanded into bored holes, doing away with all bolts, and leaving a clear passage way between the several parts. The openings for cleaning opposite the end of each tube are closed by hand-hole plates, the joints of which are made in the most thorough manner by milling the surfaces to accurate metallic contact. They are tested and made tight, under a hydrostatic pressure of 500 pounds per square inch, iron to iron, and without packing, rubber, or other perishable substance.

The fire is made under the front or higher end of the tubes,

[*Continued on page* 325.]



BABCOCK & WILCOX BOILERS AT THE STANDARD OIL COMPANY'S REFINERY GREENPOINT, L. I.

THE BABCOCK & WILCOX WATER TUBE BOILER.

[*Continued from first page.*]

and the products of combustion pass up between the tubes into a combustion chamber under the steam and water drum; from there they pass down between the tubes, then once more up through the spaces between the tubes, and off to the chimney The water inside the tubes, as it is heated, tends to rise toward the higher end, and as it is converted into steam—the mingled column of steam and water being of less specific gravity than the solid water at the back end of the boiler—rises through the vertical passages into the drum above the tubes, where the steam separates from the water, and the latter flows back to the rear and down again through the tubes, the circulation being perfect and constant. As the passages are all large and free, this circulation is very rapid, sweeping away the steam as fast as it is generated, and supplying its place with water, the heat of the fire is absorbed to the best advantage. There is a thorough circulation of the water throughout the boiler, and a consequent equalization of temperature; this prevents, to a great degree, the formation of deposits or incrustation upon the heating surfaces, carrying them away and depositing them in the mud drum, whence they are blown out in the usual way. The steam is taken out at the top of the steam drum near the back end of the boiler after it has thoroughly separated from the water.

Among the many advantages which accrue from this peculiar construction the following are most prominent: a thin heating surface in the furnace; joints removed from the direct action of the fire; a large draught area; complete combustion; a thorough absorption of the heat; an efficient circulation of water; rapid generation of dry steam; steadiness of water level; freedom from injurious effects of expansion; safety from explosion; accessibility for cleaning; ease of transportation.

The advantages hereenumerated are not merely theoretical, but they have been actually demonstrated by the use of more than 35,000 horsepower, extending over a period of twelve years, under a great variety of circumstances.

The Singer Manufacturing Company have forty of these boilers, Messrs. Matthiessen & Wiechers have twenty-five, and they are to be found in many of the largest sugar refineries and manufactories of all kinds in this and other countries, one concern having as many as 4,650 horse power in use.

The boiler fronts and the design and arrangement of the fixtures and fittings evince good taste and judgment, and are features which attract the attention of engineers and purchasers. Messrs. Babcock & Wilcox, of No. 30 Courtlandt St., New York, will furnish our readers with any further particulars.

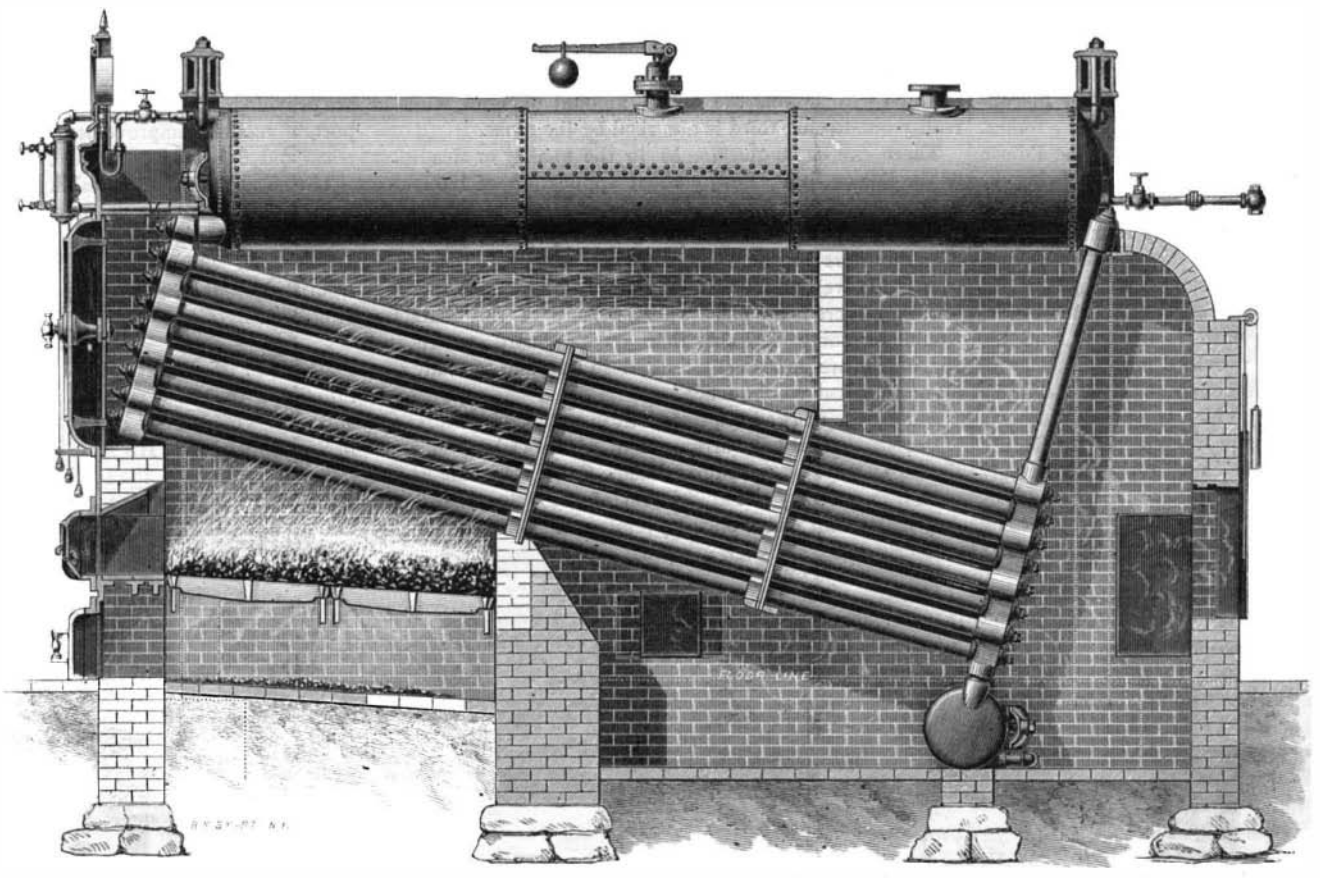


FIG. 1.—SIDE ELEVATION OF THE BABCOCK & WILCOX WATER TUBE BOILER.

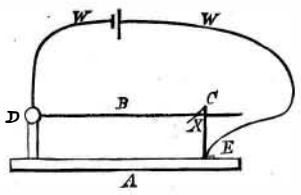
Heavy Damages for Patent Infringement.

In the suit of Christopher C. Campbell against Postmaster James, Charles Eddy, Horace T. Caswell, and Samuel R. Claxton to recover profits for the use of a patent invention in the New York Post Office for the cancellation of postage stamps and the stamping thereon of the date at one blow of the hand, Judge Wheeler in the United States Court has rendered a decision on the Master's report, mulcting Postmaster James in $63,000. This amount, the court finds, was saved in the expenses of the office by the use of the patented article, and such amount the plaintiff is entitled to as damages for the infringement of his patented rights. "The postmaster did this as such," the judge says, "but he was not obliged to do it. He could have refused the office, or resigned it, or have left this patent alone. He was not subject to any restraint, physical or moral, that he could not make subservient to his own choice. His choice was to use this invention and to make this gain. When made it belonged to the relator. Justice can only be done by requiring the defendant to restore the gains to those to whom they belong and leave him to be protected as the law provides, and in doing this no injustice will be done to any one." The judge concludes by ordering that a decree be entered that Postmaster James pay to the clerk of the court $63,000 within twenty days from the entry of the decree for the benefit of the other parties to the suit.—*N. Y. Evening Post.*

The Electrical Adhesion of Metal Contacts.

Workers with telegraph apparatus have often observed a sticking action between two metal contacts (such as the tongue of a "relay") across which a current of electricity is passing; but no experimental study of the phenomenon had, as far as we are aware, been made of the phenomenon till Mr. Stroh, the eminent mechanician, took it up. The results of his recent researches on this subject were recently communicated to the Society of Telegraph Engineers, when some exceedingly interesting experiments were shown by him.

The accompanying figure is a rough sketch of Mr. Stroh's apparatus for showing the adhesion. The metal contact, X, is formed at the crossing of a wire, B, which is supported at one end, D, and a bent wire, C, of the same or another metal, as the case may be. The current from a single bichromate cell is sent across the contact by connecting the poles of the cell by wires, W W, to the mercury contact cups, D E, connected to the wires; and A is a base board supporting the contact. The wire, B, is twelve inches long, and it ought to be fine enough to present a sharp point of contact to C. In fact, the most adhesive contact is formed by two knife-edges crossing one another. The contact must also be perfectly clean and polished. On pressing B against C with a very steady hand the passage of the current will cause the two to adhere together; and they will continue to adhere though the current be taken off. The rapid making and breaking of the current even does not dislodge B. At every make and break, however, a "click" is heard, which is louder on making than on breaking.



To measure the force of adhesion Mr. Stroh has constructed a modification of the above apparatus, in which the rod, B, is made into a kind of steelyard, along which a weight of German silver is slid until it pulls asunder the two contact edges which are stuck together by the current. These edges are beveled to angles of 45°, and they were made of different metals in order to get comparative results.

The following table shows the strength of the electric joint produced by the current from two bichromate cells of the ordinary globular form sold by instrument makers:

Contacts of	Sustained grammes.
Copper	0·15
Silver	0·15
Aluminum	2·5
Brass	8·5
Zinc	11·0
Tin	14
Gold	17
Lead	18
German silver	28
Platinum	42
Iron	85
Steel, soft	100
Steel, hard	225

It will be remarked that copper and silver contacts being the best conductors give the lowest adhesive force. This is explained by Mr. Stroh on the hypothesis that the sticking is due to a partial fusion and welding of the points of contact by heating due to the passage of the current. Copper and silver, offering little resistance to the passage of the current, are, therefore, very feebly heated or fused; hence there is only a slight adhesion. The adhesive power of the joint does not, however, strictly follow the relative resistances of the metals, owing probably to the metals being of different degrees of hardness; lead, for instance, being much softer in the contacted gethan platinum, and, therefore, more liable to be flattened out by the shock of meeting. It is not so easy to account for the extraordinary difference between hard and soft steel, the latter supporting less than one-half the weight supported by the former.

There is little doubt, says *Engineering*, that welding is the true cause of this adhesion, for the microscope plainly shows the fused edges of the contact. The result of a continued application of the current seems to be a hardening of the contact, as if it were plunged in water or tempered. This effect naturally reminds us of Mr. Edison's experiments on the shrinkage and consequent hardening of wires by passing currents through them.

In concluding his observations Mr. Stroh drew attention to the fact that the adhesion was, perhaps, chiefly due to the breaking of the current, which was always attended by a spark. Mr. W. H. Preece remarked that if the current were interrupted often enough, the resulting clicks would merge themselves into a continuous hum; and alluded to the obvious connection between such a contact and the microphone.

Distinguishing Lights for Lighthouses.

In a letter to the London *Times*, Sir W. Thomson recommends: (1) A great quickening of all revolving lights. (2) The application of a group of dot-dash signals to every fixed light. (3) The abolition of color as a distinction for lighthouse lights, except for showing dangers, channels, and ports by red, white, and green sectors.

His proposal is to distinguish every fixed light by a rapid group of two or three dot-dash eclipses; the dot of about half a second duration, the dash three times as long, with intervals of light, about half a second each, between the eclipses of the group, and of five or six seconds between groups. The distinction by color alone ought to be prohibited for all lighthouse lights, on account of its liability to be confused with ships' and steamers' sidelights.

Of about one hundred and twenty revolving lights on the English, Scottish, and Irish coasts there are in all eighteen, in which the periods are ten seconds or less, and the times of extinction seven seconds or less. In these quick revolving lights, the place of the light is not practically lost during darkness; the eye, sweeping deliberately along the horizon, with or without the aid of a binocular, "to pick up the light," passes over less than its own field of view within the period of the light, and thus finds it almost as surely as if it were fixed.

A Case of Melanosis in Philadelphia.

For some months a Philadelphia physician has had under treatment an infant afflicted with the rare disease, melanosis, in an aggravated form. The child was born with a fair complexion, dark eyes, and brown hair. Soon after birth he began to turn dark of skin, the color deepening from yellow to saffron, and finally to black. The color was uniform all over the body, except at the joints where it was a little darker, and in the palms of the hands where it was lighter. The once brown hair grew stiff and jet black, and the eyes also grew darker, so that the line between the pupils and the iris could not be distinguished.

In spite of medical treatment the boy became worse, and grew very weak, all the time the color of his skin deepening. At last he became as black as a full-blooded negro. Then he was attacked by convulsions, which grew more frequent and violent until they threatened the child's life. It was in one of these that Dr. Reynolds was called in. He succeeded in curing the spasms, and then devoted his attention to the strange disease which afflicted the child. He at once recognized it as melanosis or pigmentation, which is mentioned in the books in a general way, but there is no case given where it had developed all over the body. This was more than sixteen months ago, the child being then thirteen months old.

Since then the boy has greatly improved, by degrees becoming lighter, until now he is of a light chestnut brown color. The case has naturally attracted much attention from physicians.