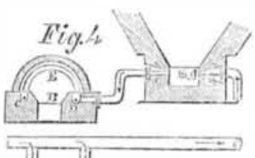
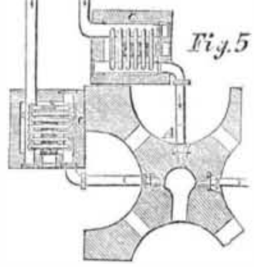
HOT-AIR OVENS FOR IRON FURNACES.

[Continued from page 164.]

It was seen that the defects of the plan Fig. 3 consisted, principally:—First, in exposing so great a continous length of pipe to the action of the heat, thus augmenting the actual amount of expansion in each straight length of pipe, the effect of which would be concentrated upon the weakest point in that length, and, at the same time, subjecting the whole apparatus to all the ill effects of any irregular expansion or contraction of the heating main at any one point; second, in such an arrangement of the grates as was necessarily accompanied with an irregular action of the heating main at each time of successive firing and cleaning out; third, in the evident inability of the ordinary flange joints to remain tight under these circumstances, since the excessive and repeated strains that they were subjected to under the variations of temperature to which they were exposed, gradually ground the cement to powder, and caused it to drop out from the joints. These formed very serious practical difficulties, and the problem presenting itself for solution, namely, the construction of an apparatus capable of raising the blast to a temperature of 600° Fah., and, at the same time, free from the above defects, must have been one involving most anxious considerations. An idea, however, at length occurred to Mr. Neilson, which approved itself to his mind, and has been the parent of all subsequent arrangements, namely, the cast-iron tubular oven.

The first practical realization of the cast-iron tubular oven is shown in Figs. 4 and 5, representing an oven erected at the Clyde Ironworks, in 1832. In this case, the irregular fire grates, five to two tuyeres, were done away with; and an oven, with one grate only, was constructed behind each of the tuyeres, now three in number; a tuyere, A, being at this time inserted at the back of the furnace, in addition to the two, one on each side, which were used before the introduction of hot-blast. In the oven now constructed, the blast, instead of being carried as formerly, along one continuous heating-tube directly over the grate, was admitted into a main pipe, C, running longitudinally at one side of the grate, B; on the top of this main pipe, a number of deep circular sockets were cast with apertures into the pipe, and on the opposite side of the grate a similar main pipe, D, was fixed, with corresponding sockets and apertures, which was connected with the tuyere pipe inserted into the furnace. The two longitudinal main pipes, C and D, on each side of the grate, were then connected by cast-iron tubes, E, each forming a semi-circular arch of six feet span, fastened into the sockets with well-rammed iron cement. The cold-blast was supplied to each of the ovens by a branch-pipe taken direct off the large main from the blast-engine, and entered the oven at the end furthest from the grate. It then passed through the arched tubes, E, over the fire, into the pipe, D, on the other side of the grate, and thence to the tuyere, leaving the oven at the end next the grate. Whilst the blast was traversing the two longitudinal pipes and the arched connecting-tubes, it received the direct heat from the grate, and was raised by this means to a temperature of 600° Fah. The whole of the apparatus was enclosed in an arched oven, so as to retain and reverberate as much heat as possible.





On comparing this with the previous plan (Figs. 2 and 3), it will be observed that this apparatus, owing to its improved construction, maintained as efficient a temperature with less than two-thirds of the heating surface per tuyere, and little more than one-half the grate area. This oven was found to be a great improvement over the one previously described, raising the temperature with less expenditure of fuel, less leakage, and greater regularity. It is evident that, in this case, the defects inseparable from the former plan were, to a great extent, remedied; for the new apparatus was constructed without any great continuous length of pipe exposed to the direct action of the heat. The irregular action of the firing was materially diminished, each oven having its own independent grate, and all flange joints were entirely excluded from within the oven.

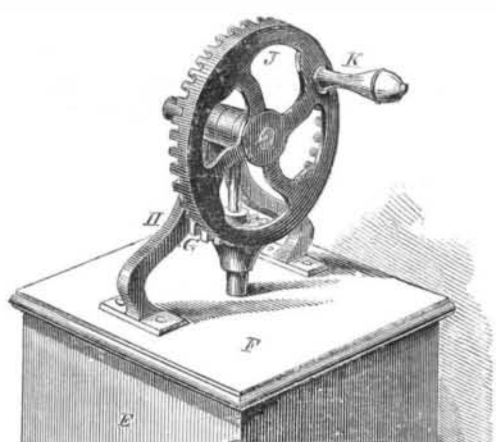
The improved oven probably seemed perfect when first erected and set to work; but after a short experience of its working, objections were urged against it by the furnace-managers, on the grounds that, although the oven answered beautiully in respect to the temperature of blast produced, yet the socket joints would still sometimes leak, no matter how hard the cement was rammed in, that the arch tubes would crack over the grate, and that, unless the stoker was very careful in firing the oven, there was danger of burning the whole apparatus down when the fire was at all hastened, a case which happened once or twice. It was also objected that, owing to the proximity of the oven to the tuyere-house, it was at all times more difficult to attend to the tuyeres; and that, in the summer time, the workmen so engaged, being hemmed in on one side by the hot ashes from the furnace on drawing the tuyere, and on the other by the oven, found themselves literally roasted. At the present day, these difficulties might have been anticipated with such a construction of oven, but, at that time, must have been a source of great annoyance. Keeping in view, however, the points already gained in the arrangement of the oven, Mr. Neilson set to work to overcome the new difficulties thus brought to light, and produced an entirely new modification of the oven.

Up to this period the reference to the history of the hot-blast oven has been confined entirely to what has been done by Mr. Neilson and his friends in Scotland; but as it now approaches the point where the experience of the Staffordshire district and that of Scotland unite, it may be well here to glance at what had been accomplished in this immediate neighborhood up to the same time.

[To be continued.]

EGG-BEATER.

The annexed cut represents an egg-beater for which a patent was granted to Thomas McBean, of Fowlerville, N. Y., on May 24, 1859.



E, is a square box in which the beater is made to revolve rapidly by means of the handle, K, and the beveled geers, J and G. The beater is formed of the spiral circular plates, A, A, soldered to the small tube or cylinder, B; which plates are so bent as to form the steps, C, C. These steps are radial from the axis of motion of a vertical shaft, D, which shaft forms the axis of the pinion, G, and communicates the motion to the beater.

For further information in regard to this invention inquiries may be addressed to S. A. Heath & Co., Inventors' Exchange, No. 37 Park-row, New York.

About 40,000 tuns of guano have been imported this year, which, at $60 per tun, amounts to $2,400,000.

TO KEEP GRAPES FRESH.

The following is a French method. Glass bottles are placed upon simple wooden racks about the outside of the fruit-room.

"Cut the bunch of grapes on the trellis at the end of the month of October, or even later, if it be possible. Let it be attached to a piece of the branch, including three or four joints below the bunch and two above. Put a little grafting wax on the upper end of this branch and introduce the lower end into a vial filled with water. The mouth of the vial may then be stopped with the wax. In order that the water may be kept unchanged, it is sufficient to add four grains of powdered charcoal to each vial. This addition keeps it pure during a whole year, It is not necessary to fill up the vials, the evaporation not lowering the level of the water more than two or three fractions of an inch in the space of six months. When the bunches of grapes are arranged as mentioned, we have nothing more to do than, from time to time, to cut away the berries that are rotten. It is essential that the temperature of the fruit-room should not descend below zero."

The editor of the *American Farmer* says that this plan of preserving the grape may be very successfully practiced with other fruits ripening in autumn, though not with a probability of preserving them fresh quite so long as the grape. He has seen fruit of the Algiers winter peach kept fresh in a vial full of water, but unsealed, for a long time. The peaches, together with the leaves, were not detached from the twig. This is worthy of trial, and the time to put it into execution will soon be at hand.

STEAMBOAT DISASTERS.

The Louisville *Courier* gives the following list of accidents which occurred on the western waters during the first six months of this year (1859).

Boats snagged	22
Boats exploded	4
Boats burnt	26
Lost by collision	13
Lost by Rock Island bridge	1
Lost by running against bank	2
Boats foundered	3
Sunk by ice	2
Lost in storm	1
Total number of boats lost	74
Flatboats lost	36
Lives lost	337
Value of boats and cargoes	$1,770,520

Were it not for such lists as these the public could form no adequate conception of the number of lives and amount of property annually lost by such casualities—no less than 674 lives sacrificed per annum. The greatest loss appear to have been caused by the burning of boats, no less than 26 being consumed; and next to this comes 22 sunk by snags. Does any one doubt the possibility of providing a remedy for most of these disasters? We do not; it is to be found in building the western steamboats of iron, in watertight compartments, and with very strong cells at the bows. Will our western boat-builders and engineers devote attention to this subject?

Aid Granted by the State of New York for Internal Improvements.—The amount of money expended by the State of New York, for internal improvements, has been as follows:

For the New York Canals	$8,401,403
For the enlargement of the Erie Canal	46,746,021
For the construction of the Internal Canals	14,719,713
Total for the Canals	$69,867,137
For the New York and Erie Railroad	$3,000,000
For the Ithica and Owego Railroad	315,200
For the Canajoharie and Catskill Railroad	200,000
For the Hudson and Berkshire Railroad	150,000
Total	$3,665,200

These sums granted to railroads have been either given outright, or have been lost by the failure of the railroad.

In addition the State loaned its credit to the following roads, which is either well secured, or has been repaid:

To the Tonawanda Railroad	$100,000
To the Auburn and Syracuse Railroad	200,000
To the Long Island Railroad	100,000
To the Schenectady and Troy Railroad	100,000
To the Auburn and Rochester Railroad	200,000
Total	$700,000