Miscellaneous.

REGENERATIVE FIXTURES FOR BOILERS.

It is a fair question whether a part of one of the regenerative attachments of modern gas furnaces may not be introduced into the ordinary boiler furnace with advantage. This is the mass of open piled fire-brick out through which the waste furnace gas passes, and in through which afterward the combustible gas passes for the supply of the furnace. The boiler furnace has, it is true, no waste gas issuing from it which can be used for this purpose with the slightest advantage, for a good boiler will absorb all the heat from this outgoing gas save what is absolutely needed to maintain the draft in the chimney. The only way in which this fraction of the regenerative furnace fixtures can be used is by piling the brick on or close behind the usual bridge wall, so that the gas passing away from the fire shall strike them. The mass of brickwork will then become heated fully, and may be made to give out part of the heat thus absorbed from the strong flame to the colder gas which passes over the bridge just after fresh coal has been thrown upon the fire. It should never be forgotten that this mass of gas arising from a furnace fire needs to be kept hot long enough to become thoroughly mixed, one part with another, or else it cannot be made to burn completely. For this reason furnaces of ample dimensions invariably give the best results, so far as smoke prevention is concerned, so long as they are skillfully managed, for then, as a rule, the gas moves but slowly away from the close nearness to the fire, or not until the combustible elements have become fully ignited and consumed.

Sometimes this open body of brick may be thus made useful in maintaining a uniform temperature under the boiler, and it may also be made effective, if properly placed, in keeping up the needful agitation for insuring the most perfect absorption of the heat from the gas in its movement beneath or around the boiler. This whirling around one part of the current upon or against another, is a far more important element in the securing both of a prevention of smoke and in the best economy of working, than is generally believed. Some men consider that the smooth, unbroken flow of a mass of gas away from a boiler-grate is the thing to be aimed at, whereas the real fact is the exact opposite, and the more completely the gaseous flow is baffled or broken up the better, so long as it is done by some means that will throw the gas against or toward the boiler. It would almost seem as though some men aimed to burn the coal in the most perfect way, without any reference whatever to the heating of the water in the boiler, as though the object aimed at was the preventing of the absorption of the heat by the water.

It is quite obvious that if this service of breaking up or baffling of the gas currents can be done by some parts of the boiler itself, as, for example, the tubes of a well-designed water-tube boiler, then the absorption of the heat by the water within the tube will be of the most vigorous and effective kind; and it is equally obvious that the high rank held by the water-tube boiler may be most justly attributed to the persistent baffling action upon the flow of gas, combined with the strong sweeping circulation of the water within the tube.

There are some objections to the use of the regenerative element referred to under boilers which are obvious, and some may not be. It is clear that it will not do to obstruct too much the draft of a fire with any contrivance, however useful may be the purpose for which it is intended; but it is certain that very much more may be done, with useful results, in the breaking up of the undisturbed parallel flow of gas under a boiler which is so common—indeed, so universal. It is also clear that if a forced draft be used, then the way is much more fully open for the use of such contrivances, and the importance of their use becomes much more clearly marked. Another objection is the danger that the openings between the brick in this "checker-work" may become choked or filled with ashes, so that the draft may become unduly obstructed, or so that only a small fraction of heat could be given out from the brickwork when a flow of cooler gas is passing. It sometimes happens, too, that a coal is used which sends so large a proportion of ash over the bridge wall that it becomes quite needful to make a large pocket behind this wall to receive and to store it, until, at the end of the week's run, it can be shoveled out and removed.

In such a case the placing of anything like additional walls, or blocks of brickwork, under the boiler may be a disadvantage in causing the more speedy filling up of these dust pockets, and the consequent carrying along of the dust into the tubes, where its lodgment will be likely to cause a much greater obstruction to the absorption of the heat than could be offset by any regenerative effect to be derived from the walls beneath the boiler.

It remains, then, a fair question for every boiler user whether, in his case, something may not be gained by the use of this simple device of a mass of regenerative brickwork, which, though placed and used in an entirely different way, is the source of so tremendous a heating and melting power as that possessed by the best open-hearth steel furnaces.—*Mechanics.*

PROSPECTING FOR WATER.

The diamond drill is now one of the best and most useful tools used in our mines. All Pacific coasters will remember the howl that was raised when the diamond drill was first taken into the lower levels of the Comstock. Indeed, such a row was kicked up about it, that the drill was secretly taken into mines and was run on the sly. In those days the miners themselves (for reasons of their own) were not very friendly to the diamond drill. It was then thought to be a great thing for use in finding out ore bodies; but it was not long before not a few discovered to their cost that for such use the drill was very unreliable.

The great use of the diamond drill, says the Virginia *Enterprise*, is now acknowledged to be not in hunting for ore, but in guarding against water. When the drill has been run ahead and the ground to be passed through probed for a distance of 150 to 250 ft., the miners feel perfectly safe in banging right along on a drift.

In most of our leading mines, such great depth has been attained that it is very dangerous to push into unexplored ground with a drift. Bodies of water are liable to be reached that stand under such pressure that the whole face of a drift may be forced in and a torrent of scalding water poured out. In the event of such an accident occurring, the men could only run for their lives to the nearest shaft or winze. In not a few situations, loss of life would be almost inevitable. Suppose, for instance that the men drifting on the 2,700 level of the Ophir or Mexican should tap a flood of water, what would become of the men at the bottom of the winze on the 2,900 level? They would be scalded to death—cooked by the hot water and the steam—almost as soon as the flood began to tumble down into the winze.

But for the fact that they know that the ground into which drifts and crosscuts are being thundered with huge blasts of Giant powder have been thoroughly probed with the diamond drill, there are many places in all our mines into which it would be almost impossible to induce miners to go. When a man has descended a winze 200 or 300 ft., then has moved out in a drift from the bottom of said winze 500 to 700 ft., it is not pleasant for him to think that, by a blunder made on a level above, a small river of scalding water may suddenly be seen pouring down and cutting off his only means of escape.

It would be impossible to get along in our mines at the present depth without the diamond drill, as all mining men know. Miners know this as well as do superintendents, and feel just as friendly toward the diamond drill, once such a bugbear, and by so many considered a swindling tool invented by either Jim Fair or the devil.—*Mining and Scientific Press.*

AN ACCIDENT WITH HYDROFLUORIC ACID.

One of the Boston medical journals gives a statement of Mr Robbins, assistant in the laboratory of the Massachusetts Institute of Technology, respecting the dangerous severity of injuries to the skin by contact with hydrofluoric acid. As this acid is much used in the arts in etching glass, porcelain and the like, and often by persons who know little or nothing of its dangerous character, we think the record of Mr. Robbins' experience with it may serve a useful purpose in impressing the necessity of caution upon those who have occasion to use this energetic reagent:

Mr. Robbins having occasion to etch a hole through a piece of porcelain, made use of hydrofluoric acid, and to facilitate the process, used a piece of match that had been saturated with the acid. Noticing that his fingers were getting wet, he washed them and applied tallow. He held the match in his fingers the greater part of an hour and a half, and about the end of that period noticed a loss of sensitiveness in the end of the finger and thumb, and some pain. He again washed them, and