

SARGENT'S SMOKE PREVENTING FURNACE.

The great desirability of some simple form of apparatus by means of which the smoke of boiler furnaces will be effectively consumed has long been conceded, and it is especially needed in all manufacturing centers where soft coal is used. It does not require many establishments, whose furnaces are fired with bituminous coal in the ordinary way, to pollute the atmosphere and deface the buildings of a pretty extensive area, with the large amount of smoke discharged from the chimneys, added to which is the waste of fuel accompanying this discharge, of which every engineer is conscious as he notices the volumes of black carbon rolling skyward. To obviate this difficulty is the design of the smoke-preventing apparatus shown as applied to a furnace in operation, in the accompanying illustration, and which has been patented by James Sargent, Esq., of Rochester, N. Y.

The apparatus works automatically, being controlled by a time movement. A pipe leads from the top of the boiler to the inside of the fire box at its front end, where, upon opening a valve, dry steam is discharged in powerful jets upon and over the surface of the coals, forcing the smoke, at the instant of forming, into the live coals, where it is consumed. The valve for starting the steam discharge is operated automatically with the opening of the furnace door to feed the fire, the swinging open of the door also actuating a lever connected with a time movement, whereby an air door is raised, the discharge of steam continuing, and the air door remaining open until the combustion of the newly supplied coal has been well started; and, finally, when the hydrocarbons are all distilled off and consumed, the steam jet and air door are both shut automatically. The time movement is adjustable, so that this period can be made longer or shorter, as may be desired.

That the combustion is actually improved by this smoke consumption is proved by the fact that the steam gauge shows increased pressure during the time the air door is kept open and while the fresh coal is being started, according to this method. The boiler tubes, also, do not require the frequent cleaning necessary under the old plan, being entirely free from the usual accumulation of gummy soot, but having, instead, only a slight deposit of a dry, ashy substance.

This smoke consumer has been for some time in successful operation in several large establishments in Rochester, N. Y., notably in the Kimball tobacco factory, and the result of two days' trial at the latter place, one day with and the other day without the use of the device, is given in the following certificate:

June 22, 1892.—With smoke preventer:
2,433 lb. coal consumed in seven hours and twenty minutes.
Weight of water evaporated, 21,600 lb.; 888 lb. of water to 1 lb. of coal.
Steam pressure, 66 lb.
Comparatively very little smoke at any time.

June 23, 1892.—Without smoke preventer:
2,433 lb. coal consumed in six hours and forty minutes.
Weight of water evaporated, 18,823 lb.; 773 lb. of water to 1 lb. of coal.
Steam pressure, 64 lb.
At each time of firing, and from five to eight minutes afterward, a heavy volume of smoke issued from the chimney.
W. J. DUNN,
Engineer.

It will be readily seen that the application of the time movement, for the control of the steam discharge and the operation of the air doors, according to the draught of the furnace, the kind of fuel, and the manner of feeding, gives the engineer the means of regulating the working of the apparatus in such manner as to almost entirely prevent the escape of smoke into the air, practically irrespective of the condition of the weather. The apparatus may be attached in a few hours to any steam setting, without in any way interfering with its regular and continuous use. It is durable, and when once in place, requires no more attention than any other fitting to the boiler or furnace. It is moderate in first cost, and its use in the majority of cases will lead to an economy of fuel more than sufficient to pay for it in a short time.

As shown in the sectional elevation of steam boiler and furnace with the apparatus attached and in full operation, the dry steam is conveyed from the top of the boiler and injected into the fire box through two

with a special form of tip, two jets being thought, in ordinary cases, to give the best results, although in one class of special cases a single jet will be sufficient, while in another, three or more will be used. The special tip is so constructed as to distribute a thin sheet of steam moving with high velocity throughout the entire upper portion of the fire box. As shown in the cut, the steam jets enter the fire box above the air inlet, whence it results that the current of air is carried into the furnace in a solid column, which for a considerable portion of its journey from the boiler front to the bridge wall is mostly confined between



O'DONNELL'S ENVELOPE AND WRAPPER.

the sheet of steam above it and the live fire beneath. The specific heat of air is so slight that the entering air current quickly reaches the temperature of the incandescent coal beneath, so that by the time the current reaches the vicinity of the bridge wall it is in proper condition to produce, in conjunction with the steam, a complete combustion in the manner described. Moreover, during the latter part of the journey from front to rear in the fire box, the expansion of the air current has caused it to ascend and mingle with the steam jet, thereby producing, through the medium of a blowpipe action, the necessary conditions for perfect combustion. In its practical application, thus far, a decided saving of fuel has been proved to be effected by this improvement, as well as the almost complete abatement of the smoke nuisance.

James Sargent.

The name of the inventor of the smoke consumer above described has been for a long time a familiar one with all who take pride in the triumphs of American invention for which this age is noted. From 1852, when he first engaged in a manufacturing business on his own account, until the present time, his numerous inventions have constituted a conspicuous feature in the Patent Office records, but probably the most widely known of them all is the time lock. As a traveler for the Yale & Greenleaf Lock Co., Mr. Sargent early

became a noted "lock pick," and, finally, in 1865, commenced the manufacture of a lock invented and patented by himself. As a prominent feature in this invention, a powerful magnet was introduced, which held other parts sufficiently under its control to prevent the use of a micrometer in measuring motion or determining relative positions of the unlocking devices. This was, and is, known as the Sargent magnetic bank lock. A mechanical, automatic device was later introduced for the same purpose, which dispensed with the magnet, and is the prevailing style at this time, under the name of the Sargent automatic bank lock. Numerous experiments, improvements, and changes were constantly made, until, in 1873, Mr. Sargent perfected his first model of a time lock, which was put in practical use by a bank at Morrison, Ill., in May, 1874, and is still in service. This style of lock has proved a wonderful success, and it is said that the original forms were so complete and comprehensive that no radical change has been found necessary in the lock up to the present time. Mr. Sargent, though still retaining his interest in the lock business, is also engaged in a diversity of other enterprises.

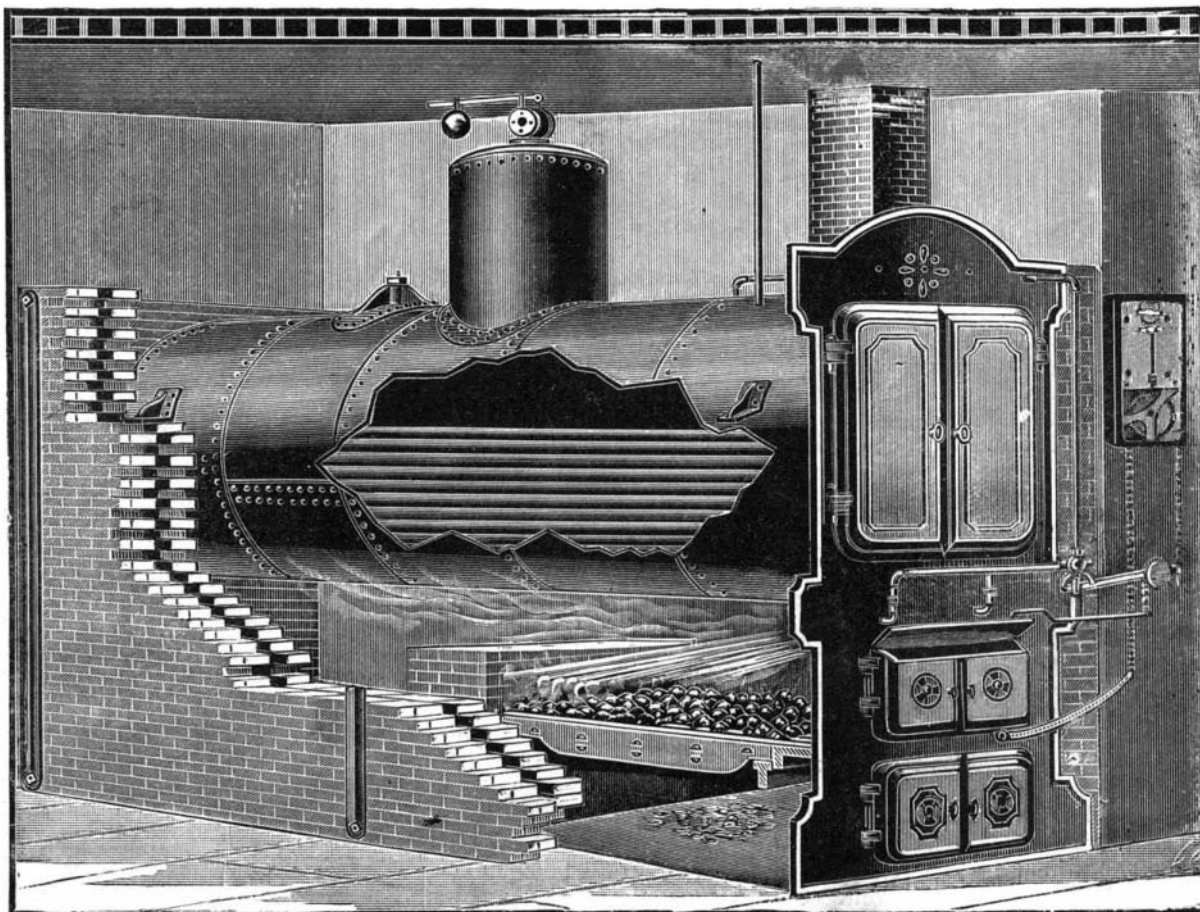
AN IMPROVED ENVELOPE AND WRAPPER.

A letter envelope, or a wrapper for holding newspapers or other packages, made after the method shown in the illustration, may be easily opened without any possible injury to the contents, the envelope or wrapper being also cheaply made. The improvement has been patented by Mr. Timothy J. O'Donnell, of Lawrence, Mass. The envelope or wrapper has its fastening flap provided with re-enforcing or extension flaps adapted to be doubled over the fastening flap along its two edges. The extension flaps are gummed on the surfaces which come next the body of the envelope or wrapper, and at the central point of the flap, where the two extension flaps meet, the flap is bent outward, a small portion at that place being left un-gummed, thus affording a free or unfastened end piece, by taking hold of which the envelope or wrapper can be easily torn open. This saves tearing off the ends of the envelope and preserves its contents entire. The re-enforcement of the wrapper afforded by this re-enforcing flap is designed to be especially valuable with wrappers the body of which is made of cheap, thin material, easily tearing or breaking at the point gummed. If desired, the extension flap may be made in a single piece stuck or otherwise secured to the flap of the envelope or wrapper, and where the latter are of very thin material, the re-enforcing strip may be made of material of a better quality.

Boxwood Substitutes.

Boxwood, imported into England from Turkey and Asia Minor and used by engravers, and for the manufacture of rules, mathematical instruments, shuttles, etc., has risen in price so rapidly, owing to the exhaustion of the Eastern forests, that dealers are searching in every direction for a substitute. For engravers' use no substitute has as yet been found, but for the manufacture of shuttles, which consumes vast quantities of timber in the weaving districts of England, American dogwood and persimmon wood are beginning to find considerable favor, and the trade in these woods, if fostered, bids fair to assume considerable proportions.

The American consul at Manchester, Mr. Grinnell, writes as follows concerning it: The best wood from the United States to supersede boxwood is dogwood (cornel, as it is more commonly called here), which, owing to its relatively moderate price (\$18 to \$20 per ton), may, it is thought, if more carefully selected, ultimately replace the more expensive boxwood for the purposes in question. The pieces should not be less than five to six inches in diameter, in length as long as convenient, say twelve feet, to be cut here into thirteen or fourteen inch lengths for working up. Of course, the wood should not be split, and the greater the diameter the better, if the heart is sound and it is free from other fault. It is again urged upon the shipper, as vital to the interests of himself and the trade, to reject all doubtful or bad pieces.



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