

of fermentation, which can render it less digestible than the best fermented bread, as some have imagined it might be. We therefore regard this process as a great improvement upon the laborious and generally uncleanly old process; and, if it be honestly applied, we may hope that bread made by skilled persons, in large bakeries, will supersede the poor bread made by inexpert domestics, and the still worse bread made by common bakers. Consumers may save much, while bakers make liberal profits, by such a system of division of labor and application of capital.

The Daughlish patents are owned by the Boston Wheat and Bread Company, 1010 Washington street, Boston. Application may be made to this company for licenses and machines.

Cast-Iron Columns and Beams.

In cases of fire, where the heat is intense, cast-iron columns and beams become weak. The same is the case with wrought-iron. Hence, although iron makes a safe building for offices, in which there is not enough combustible to heat it above 600°, it is unsafe for buildings in which combustible goods are stored, unless access of air is prevented, so that there cannot be combustion enough to heat the iron above this point. Attempts have been made to protect iron from heat, by plaster and brick-work and by water inside; but there are decided objections to these expedients. Whether wood has been used as the core of a hollow column or beam we do not know; but as wood, when shut up in iron, so that air could not reach it, would be a long time in charring to a depth that would much weaken it, it is evident that hollow cast-iron columns might be prevented from bending under their load while hot, by fitting in pine columns inside, and the pine would greatly strengthen them while at the ordinary temperature; and by shutting the wood tightly, so as to exclude air and moisture, it would be made almost imperishable. Columns thus stiffened need not have so much iron in them as is necessary when they have nothing in them, and the saving of iron might partly pay the cost of the wood. In the same way box-girders might be stiffened with wood; the iron in case of fire, when too hot to bear much load, would preserve the wood from combustion; and the strength of the wood might suffice to hold up the weight, and prevent the crash that usually happens when iron buildings get so hot as they are liable to get when they contain large stores of combustible, and ignorant firemen smash in doors and windows to give free access to the air to make the fire intense.

For dwellings, offices, and other buildings that contain little to heat them, iron alone will make them fire-proof; but for stores, wood that is absolutely excluded from air will be necessary to sustain the load while the iron is weakened by heat.—*American Artisan.*

History of Fire-engines.

The promised work of Mr. C. F. T. Young on fire engines, etc., is published. *Engineering* has some engravings from it, and a brief notice of the first steam fire-engines, built in England and this country. The first were by Braithwaite &

Ericsson, who built five; one of them, the "Comet," in 1832, for the king of Prussia. It had two horizontal steam cylinders 12" bore and 14" stroke, working pumps 10½" by 14", and weighed 4 tons; raised steam in 13 to 20 minutes, and threw 336 gallons per minute. The first American engine was built in New York by Paul R. Hodge, in 1840-1. It had two steam cylinders 9½" bore and 14" stroke, driving 8½" pumps of the same stroke; and threw 1,032 imperial gallons 166" high per minute through a 2½ nozzle. It has a short and thick locomotive boiler, surrounded by a dome. Its hind wheels were connected to the engines, and acted as fly-wheels when pumping, and were sometimes used to assist in propelling the engine through the street; but usually were disconnected, and the engine was drawn by two large horses. By this account it appears that this engine was about as effective as the "Cary" and "Storm," self-propellers, built by Lee & Larned, at the Novelty Works, in 1857. We never saw this engine, but we are informed by an old fireman that she worked well. Mr. Carson, who was at one time chief engineer of the Fire Department, makes the same report of her. The reason assigned for her failure to keep in use is, that the insurance companies which built and worked her found the expense greater than the estimated saving to them. As for the public authorities, they, as usual, did not move themselves, and the firemen did not move them. From the engraving and the reports, we judge that this plan of engine is better than those now in favor with the department; and if it were perfected in details and proportions, and fitted with steering gear to make it independent of horses, it would be a good engine.—*American Artisan.*

Wooden Waggon Springs.

A new spring for road waggons has been introduced by the Messrs. Brenditers, of New York, one of the oldest waggon firms in the country. The idea of a wooden spring, it appears, originated with a young house carpenter named Parker, who believed they could be made with greater elasticity, and capacity, while free from the brittle, uncertain and comparatively unmanageable nature of steel. He accordingly worked out the idea, and has succeeded in producing a spring consisting of a pair of bows of hickory, weighing, when finished, and of the proper strength to carry two persons, about six pounds—or about forty-five pounds lighter than a pair of the lightest elliptic springs.

The arches of these springs rest upon the axle as usual; the ends, rising at a moderate angle, meet midway between the axles, and are there champed to a couple of light brackets, which support the body of the waggon, one along the center of each side. It is also demonstrated that the supple hickory wood will yield more gracefully to any jar than even well-tempered steel, especially as all pressure is necessarily exerted in the direction of the pressure is an insurance against breaking under a sharp and sudden strain, such as snaps the ordinary spring by cracking its leaves across. The tough vitality of the wood promises durability, and it needs but a glance to perceive the additional beauty which this method of construction gives to the lines of a light vehicle.