

red heat, for at a lower temperature the oxygen of the steam would be converted into carbonic acid, and since this is not combustible like carbonic oxide, it would contribute no heat in the combustion chamber. If, however, the generator were too strongly heated, a correspondingly larger quantity of carbon would be separated by the decomposition of the gases, and the supply of steam might be insufficient for its consumption. By judiciously regulating the supply of steam, the corrosion of the generator by the combination of the iron with the oxygen of the steam, may be rendered of small account. The arrangement for heating the generator should be such as to prevent, as far as possible, oxidation by air admitted into the flue or furnace.

In the application of this mode of generating heat to steam boilers, the maximum evaporative effect ought to be obtained with greater certainty than when an ordinary coal fire is employed, because the combustible gas issues from the burner under considerable pressure, and thus helps to create the draught, which is produced in coal-furnaces, almost exclusively, by the high temperature and consequent ascensional force of the products of combustion escaping by the chimney. To confer this, ascensional force consumes, it is said, as much as one-fourth of the heat generated in the furnace, since the temperature of the air as it escapes from the chimney must not be reduced below 600° F., or the furnace will not draw; whereas the impulse given to the gases issuing from the burner under consideration would probably allow the temperature of the escaping air and products of combustion to be reduced below this point. In all operations which are required to be suspended or arrested at any given period, a fuel of this kind, the supply of which may be discontinued at once, obviously possesses a great advantage over an ordinary coal or coke fire"—*Oil Trade Review*.

Machinery and Manufactures.

Artificial Leather from Leather Cuttings.

[A part of an article translated from the *Geißer Zeitung* for the *Shoe and Leather Reporter*.]

We are continually hearing of some new discovery or invention for the utilization of waste substances. The following clipping is from the *American Artisan*, and it certainly astonishes us not a little:—

"The parings and clippings of untanned hides, especially of those that come from beyond the Atlantic, are cut into small strips by means of a machine constructed for that purpose. The shreds when cut are soaked in water impregnated with strong muriatic acid, in the proportion of one part of the acid to one thousand parts of water. The temperature of the solution may vary between 15 and 26 degrees. The time that it must remain soaking depends on the thickness of the leather and the temperature of the solution; two days are sufficient if both the above are favourable, otherwise it requires four days. The strips, when thoroughly soaked, are washed in several waters,

and then spread out on hurdles in the open air to drain off the water, and becomes somewhat dry. In that half-dried condition the minced leather is subjected to a double motion of two cylinders, the one with a tap, the other being railed. The effect of the motion upon the leather is to reduce it to a uniform stiff lump. This shapeless material is then deposited in a vessel or some convenient place, the temperature of which ranges between 15 and 24 degrees, where it is left for two days, only being stirred or turned over from time to time with a shovel, till it becomes glutinous and soft to the touch. A mixture is then made, composed of 95 parts of this material and 5 parts of a thick vegetable mucilage, obtained by making a decoction of wild lichens, and then letting the decoction evaporate. Or, the mixture may consist of 90 parts of the leather material, 5 parts of the above-named mucilage, and 5 parts of either hemp or some other downy thread.

Out of the above composition straps can be made of any length or breadth that may be desirable, by letting them pass through wooden or iron cylinders. The straps are first put upon lathes while in a moist condition; they are then plastered on both sides, first with fish oil and then with the following vegetable composition:—one part of wild lichens boiled in twenty parts of water, the decoction to be filtered and left to evaporate till it is reduced to a thick mucilage. To one part of this mucilage, add eight parts of train oil, 4 parts of palm oil, and 4 parts of coconut oil. The different oils are mixed by being melted over a slow fire, and, while yet hot, the whole is poured into the mucilage and mixed up therewith. The leather strips after being plastered over with the above composition, are left in a place of about 15 degrees temperature for some two or three weeks, till they have absorbed the moisture of the composition. Should there be any grease remaining, it is removed with a paint-brush dipped in soda-water, and pressed over the surface of the leather. The leather is now again made to pass through two iron cylinders, by which it is pressed and glossed. This artificial leather is rendering good service to various industries, since it may with safety be used for machine straps, trimming furniture, etc."

Bessemer Steel Rails.

It will be remembered that Mr. Moon stated at the last London and North Western meeting, in reply to a shareholder, that experiments were being made with a view to having rails with steel at the top and bottom of the rails, but iron in their body, which would effect a further economy in the use of steel rails. They would have that part of the rail exposed to wear, of steel, and that which is not subject to wear (for practically a rail is not worn down before a certain point) of iron. But this difficulty arose in carrying out the plan—the steel could not be thoroughly welded to the iron in the process of rolling, or so thoroughly that it would not loosen itself, when of course it was useless for train running. Success, however, has since attended the plan by adopting another method of connecting the steel with the iron. Instead of placing a plate of steel at the top and bottom of the pile to be rolled into a rail, there is