

employment. The largest field into which the condensing steam engine has been introduced is that of steam navigation, and at the present moment the most improved modern marine engine acts with little, if any, more efficacy than one of Watt's old engines using the same pressure of steam. This being its present state, let us now see what improvements are available.

And, first, there is no longer any reason why some such pressures of steam as 100 lbs. on the inch should not be introduced. Of what avail is surface-condensation if advantage is not taken of its presence to introduce high pressure? But the boilers! There, no doubt, lies the difficulty, and how is it to be surmounted? We answer, by the employment of square haystack boilers of large dimensions, with the external and internal shells stayed together, like the fire-box of a locomotive, and terminating in a pyramidal dome, with sufficient room within to permit the withdrawal of the upright tubes in which the water circulates. The external water space should be sufficiently large to return rapidly any water carried upwards through the tubes by the ascending steam, and the tubes should not be very long or large in diameter, but each tube should have a short loose piece of tube inserted in its mouth below the water, so as to increase the length of the ascending column, and consequently the ascensional force. In both the surface-condensers and the boilers the arrangements should be such as to insure the rapid circulation of the water, that condition being of the last importance to produce efficiency in the heating or cooling surface. Then *all the furnaces should be gas furnaces*. In firing the furnaces of steam vessels as at present constructed the labour is enormous, and the work is ill and dearly done. It is difficult, especially in a sea-way, to throw in the coals so as to cover the grate evenly, and so that there shall be no holes through which the cold air may enter to cool the furnace without promoting the combustion. Besides, once every watch, while the vessel is on her voyage, a certain number of furnaces has to be entirely emptied and lighted anew, so as to clear them of the clinker, which would otherwise choke up the bars of the grate. If, however, the coal were raised by an endless screw into the gas-generator, in the lower part of which a rapid combustion should be maintained, the clinker could be run out like the slag in an iron furnace. To increase the efficacy of the heating surface and diminish the size of the boiler, the air by which the combustion of the gas is maintained should be heated to 1,200°, or more, by the smoke or vapors escaping from the furnace. The feed-water should be used as injection to condense the educted steam, so that it might be heated to the highest possible point before being sent into the boiler. It would not be difficult to introduce an arrangement like Sterling's regenerator to heat the entering air by the escaping smoke, or rather vapors, as there would be no smoke under the proposed arrangement.—*Engineering*

Imitations of Gold.

Oreide, the beautiful alloy resembling gold, manufactured in Waterbury, Conn., is a French discovery, and consists of pure copper 100 parts; zinc, or (preferably) tin, 17 parts; magnesia, 6 parts; sal ammoniac, 3.6 parts; quicklime, 1.8

parts; tartar of commerce, 9 parts. The copper is first melted, then the magnesia, sal ammoniac, lime, and tartar in powder, are added little by little, briskly stirring for about half an hour, so as to mix thoroughly; after which zinc is thrown on the surface in small grains, stirring it until entirely fused; the crucible is then covered and the fusion maintained for about thirty-five minutes, when the dross is skimmed off, and the alloy is ready for use. It can be cast, rolled, drawn, stamped, chased, beaten into a powder or leaves, and none but excellent judges can distinguish it from gold. Another beautiful alloy rivalling the color of gold, is obtained with 90 per cent copper and ten per cent aluminum, which must be perfectly pure, of the best quality, and in exact proportion. It is little affected by the atmosphere, and is strong, malleable, and homogeneous in structure.

Pneumatic Despatch Tube in Paris.

The tube connects the telegraph stations at the Bourse and the Grand Hotel, and is the first installment of a complete system throughout Paris. The method adopted is the reverse of our own, namely, the elasticity of compressed air in place of a partial vacuum, so that neither an air-pump nor a steam engine is required. The power used is water from the reservoirs of the city of Paris, which gives an ascension of rather more than fifty feet. There are three vessels, made of iron plate, and measuring each about 1,200 gallons; the first of these receives the water and effects the compression, the two others are the compressed air. As the water arrives the air within the first vessel is of course forced into the other two, which are connected with it by a valve opening inwards. When the first vessel is filled with water, another cock is opened, the liquid is allowed to run off and the air to enter by means of a valve provided for the purpose; the operation is then repeated and the effect is the production in the two condensers of a pressure equal to about two atmospheres. The tube that connects the two stations is of cast-iron, about 3,500 feet long and 2½ inches in diameter, having its termini in two chambers with tightly-fitting doors, which allow the piston dispatch-box to be placed or withdrawn from the tube without difficulty. This carrier is a small brass cylinder, four or five inches long, closed at one end, and with a moveable cover at the other. It will contain about forty dispatches in envelopes. Five minutes are found to be sufficient in practice for the piston to make the double journey. The time occupied in the passage of the dispatch-box in one direction is sufficient to produce the necessary pressure for the return.—*The Engineer*.

Cracking of Upper-leather and Calfskins.

The principal cause of the cracking and rottenness of upper leather and calfskins is a want of care in cleaning the lime from the hide or skin. Every leather manufacturer knows that lime left in the hide or skin is extremely injurious, that it tends to make the leather hard and brittle, and that the processes of tanning and currying will not entirely eradicate it, although the leather may be thoroughly scoured. Another cause is the use