

and then treated with plaster of Paris as above, when the article will be found perfectly clean, as if just from the hands of the sculptor.

A piece of sculpture, that would take several days to clean by the usual way, with fish skin and Dutch rushes, is, by this process, completed in half an hour.

On the superior advantages of employing a soft and gentle blast from the Bellows of Smith's Forges, in certain cases, over the sharp blast produced in the ordinary manner of employing them. By DUNCAN CAMPBELL, Esq.

MR. CAMPBELL is enabled by this improvement, to perform many of the most delicate and difficult operations in smithery, and particularly to weld two pieces of tolerably hard cast steel together, a thing held to be scarcely possible.

He employs a small pair of smith's bellows, viz. only eighteen inches in breadth, and instead of overloading their upper board with weights, as usual, in some cases he actually removes much of their own weight, by counterbalancing weights.

In commencing to heat a mass of iron, Mr. Campbell indeed loads his bellows with weights, but, as the mass becomes heated, and especially when it approaches towards a welding heat, he gradually removes them; and, at length, hangs them upon a hook, attached to a line, passing over a pulley, and affixed to the hinder part of the upper board, so as to take off the greater part of its weight. He can thus keep a mass of iron in a continued heat, as long as he pleases, and cause the heat to penetrate to the interior of the mass, without burning away its exterior, or oxyding it by the force of the blast, as usual. We have thus seen him bring a mass of iron, two inches square, and seven or eight inches long, to a welding heat, without the use of sand, to defend its outward parts in the fire; and to continue it in that state for a considerable length of time.

Mr. Campbell also uses a wider aperture to his bellows and tuyere than is usual; his tuyere is an inch in diameter, and widens towards the forge fire, and it thus diffuses the blast more uniformly than in common.

He assures us, and we do not doubt the fact, that he can lay two pieces of cast-steel, properly shaped, under the hammer for welding, as usual, upon each other, in his forge fire; and, by regulating and tempering his blast, cause them to sweat, fuse, and finally unite together, without hammering!

Mr. Campbell so manages his bellows-handle, by a repetition of short and quick strokes, that towards the end of a heat, he does not ever cause the upper hoop of the bellows to rise, and add its weight to increase the force of the blast. It is also his intention to add a gasometer to his bellows, to equalize the blast, and thus avoid those little irregularities, which at present he unavoidably experiences.

We must own, that in all our experience we have never seen the

forge fire under such absolute command, and such valuable effects produced from it, as in Mr. Campbell's management.

Mr. Campbell does not approve of the cast-iron forge backs, now in general use; which, although durable, nevertheless rob the fire of a very considerable portion of heat. He prefers to employ bricks set in loam for his forge-back; and the little trouble of occasionally renewing it, is more than compensated by its slow conducting power for heat.

Mr. Campbell is particularly careful in the management of his forge fire, by continually adding wetted small coal, and even occasionally sprinkling water upon its exterior surface, to preserve a good *hollow fire* within it.

We need hardly mention the *great ease* with which *bellows loaded with so little weight* can be worked: and indeed the left hand is fully sufficient to keep the blast up, the right hand being employed in governing the weights, and in attending to the management of the fire, and the article to be heated in it. For *working cast-steel*, in particular, where such great nicety in heating it, is requisite, the *soft fire* thus produced, is most admirably fitted. [Tech. Rep.

ON GILDING, SILVERING, AND TINNING.

FROM NICHOLSON'S OPERATIVE MECHANIC.

(Continued from p. 309.)

To Whiten Copper and Brass.—Boil six pounds of cream of tartar, four gallons of water, and eight pounds of grain tin, or tin shavings. After the materials have boiled a sufficient time, the substance to be tinned is put therein, and the boiling continued, when the tin is precipitated in its metallic form. Pins are thus whitened.

To Tin Copper and Iron vessels.—Iron which is to be tinned, must be previously steeped in acid materials, such as sour whey, distillers' wash, &c.; then scoured and dipped in melted tin, having been first rubbed over with a solution of sal ammoniac. The surface of the tin is prevented from calcining, by covering it with a coat of fat. Copper vessels must be well cleansed; and then a sufficient quantity of tin with sal ammoniac is put therein, and brought into fusion, and the copper vessel moved about. A little rosin is sometimes added. The sal ammoniac prevents the copper from scaling, and causes the tin to be fixed, wherever it touches. Lately, zinc has been proposed for lining vessels, instead of tin, to avoid the ill consequences which have been unjustly apprehended.

To prepare the Silver Tree.—Pour into a glass globe or decanter, 4 drachms of nitrate of silver, dissolved in a pound or more of distilled water, and lay the vessel on the chimney piece, or in some place where it may not be disturbed. Now pour in 4 drachms of mercury. In a short time, the silver will be precipitated in the most