

FIGS. 1 TO 5.—BLOWPIPE BELLOWS.



FIG. 7.—GRINDING BORAX.



FIG. 9.—INGOT MOULD.



FIG. 10.—CRUCIBLE TONGS.

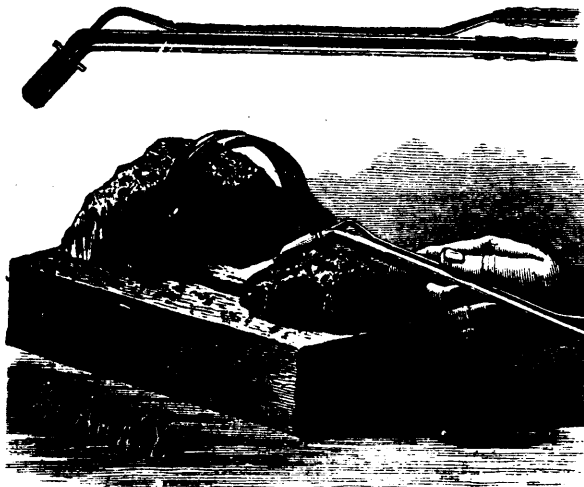


FIG. 6.—BRAZING.

After the metal is rendered sufficiently fluid it may be poured into an oiled ingot mould, shown in Fig. 9, thus giving it a form adapted to rolling or hammering, or it may be poured into a sand mould, giving it any desired form. The crucible is handled by means of the tongs shown in Fig. 10.

The body of the Fletcher furnace is formed of clay treated in a peculiar way to render it very light and porous. It is $4\frac{1}{2}$ inches in external diameter and $4\frac{1}{2}$ inches high. Its internal diameter at the top is $2\frac{3}{4}$ inches, at the bottom $2\frac{1}{4}$ inches. The hole at the side is $\frac{3}{4}$ inch in diameter. The cover, which is $1\frac{1}{2}$ inches thick and of the same diameter as the body, is concaved on its under surface and provided with a $\frac{5}{8}$ inch central aperture. The cover and the body are encircled by sheet iron.

It is not difficult to make a furnace which will compare favorably with the original article. Any tin or sheet iron can of the right size may be used as a casing for the furnace, provided it be seamed or riveted together. A quart wine bottle having a raised bottom serves as a pattern for the interior of the furnace. The upper portion of the raised bottom

is filled in with plaster of Paris or cement to give the crucible support a level top. The material used in the formation of the furnace is clay of the quality used in the manufacture of fire bricks, or even common bricks, moistened and mixed with granulated fire brick. The material known as "stove fix," used in repairing the lining of stoves, answers very well when mixed with granulated fire brick or pumice stone.

The can is filled to the depth of an inch with the material. The chambered bottom of the wine bottle is oiled and filled with the material and placed in the can as shown in Fig. 11. A $\frac{3}{4}$ inch wooden plug is inserted in a hole in the side of the can, to be afterward withdrawn to form the blast aperture. The can is then filled with the clay mixture, which is tamped in lightly. The material should not be too wet, and it is well to oil the bottle to facilitate its removal. When the filling operation is complete, the bottle is loosened and withdrawn. The cover is formed by filling a suitable band with the clay mixture. The furnace is allowed to dry for a day or so. The first time the furnace is heated, the temperature should be increased very gradually.—*Scientific American*.

PHOTOGRAPHING PATTERNS.

Sterling Elliott sends to the *American Machinist* the following plan for keeping track of patterns :

Spread a white paper on the floor, lay patterns on it in proper order, place on each pattern a small square of white paper on which is painted a black plain figure beginning with one, two, three, etc.; these may be cut from an old calendar, or painted purposely. Directly over the patterns suspend by any suitable means a photographic camera, and you have it. From the negative thus obtained, make two blue prints; send one to the foundry, and the old problem of marking patterns is not only solved, but lost patterns are much more easily found; for a pattern, unlike an actress, resembles its photograph every time.