

6th. All parts of the Valves are made interchangeable by machinery, so that any part can be replaced at once, on giving us the size of Valve and name of part, which can be ordered by the reference letter on the cuts.

Fig. 1, page 329 is an outside elevation and figures 2 and 3 is a vertical section of our Brass Valves, for "jam or water-purposes, in which A represents the body of the Valve; F F the Valves, partly opened; N (or K in figs. 5 and 6, the Valve-seats inclined to one another; D the cage which carries the discs F F, and which are perfectly loose in the same; E is the Equalizing Bar, —one on each side of cage D, which allows the Valves or Discs F F to seat themselves truly on the seats N (or K in figs. 5 and 6); the cage D, with the discs F F, are elevated or depressed by the square threaded screw B, which in the Iron-body-Valves shown in Figs. 5 and 6, works in a loose brass nut C, contained in a chamber cast on top of cage D. The stem B has a collar M cast upon it, which is tapered and ground to a perfect-fitting joint, (steam tight), upon which is a "thrust collar" of brass, H, which fits on a shoulder in the Stufing Box, allowing the stem to be loose enough to rotate, but not to lift. Upon this is placed a "Patent Metallic Packing," I, in the hollow of which is wound a little hemp; the gland J is then screwed down, and everything is secure.

BALANCED FURNACE DOORS.

Possess the greatest command over Furnaces for Preventing Smoke. As they are balanced, and work from the top instead of the side, they will swing either inwards or outwards, and remain in whatever position they are placed. When set in the position shown by the Engravings, they cause the air to enter at the lower part only, and to mix with the gases that are evolved during the process of combustion, causing them to become perfectly developed into flame before leaving the furnace, and consequently preventing the emission of smoke. The Patent Doors work with greater facility than ordinary ones, and are more durable under heavy service. They are made of all sizes and forms, to suit either iron or brickwork.

STAINING WOOD RECEIPTS.

CHEAP BLACK WALNUT STAIN.—Burnt umber, 2 parts, rose pink, 1 part, glue, 1 part, water sufficient; heat all together and dissolve completely, apply to the work first with a sponge then go over it with a brush, and varnish over with shellac.

EBONY STAIN.—Drop black, 2 parts, rose pink, 1 part, turpentine, a sufficient quantity.

EXTRA BLACK STAIN FOR WOOD.—Pour 2 quarts boiling water over 1 oz. of powdered extract of logwood, and, when the solution is effected, 1 dr. of yellow chromate of potash is added, and the whole well stirred. It is then ready for use as a wood-stain, or for writing ink. When rubbed on wood, it produces a pure black. Repeat with 2, 3, or 4 applications, till a deep black is produced, which acquires the highest beauty when polished or stained.

IMITATION OF MAHOGANY.—Let the first coat of painting be white lead, the second, orange, and the last, burnt-umber or sienna imitating the veins according to your taste and practice.

TO IMITATE WAINSCOT.—Let the first coat be white; the second, half white and half yellow ochre; and the third, yellow ochre only; shadow with umber or sienna.

TO IMITATE SATIN WOOD.—Take white for your first coating, light blue for the second, and dark blue or dark green for the third.

BEST CEMENT FOR AQUARIA.—It is the same as that used in constructing the tanks of the Zoological Gardens, London. One part, by measure, say a gill of litharge; 1 gill of plaster of Paris; 1 gill of dry, white sand, $\frac{1}{2}$ a gill of finely powdered resin Sift, and keep corked tight until required for use, when it is to be made into a putty by mixing in boiled oil (linseed) with a little patent drier added. Never use it after it has been mixed (that is, with the oil) over fifteen hours. This cement can be used for marine as well as fresh water aquaria as it resists the action of salt water. The tank can be used immediately, but it is best to give it three or four hours to dry.

ECONOMICAL HEATING OF BUILDINGS.

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In the same way that water from a reservoir on the top of a house may be distributed to its various rooms by means of proper pipes and other arrangements, so as to save the labor of carrying it up to the different apartments, the heat from a heat-generator or furnace in the cellar may be distributed to the various rooms by means of proper flues and other arrangements, so as to save the still greater labor of carrying up fuel to keep stoves burning.

Among the furnaces for heating buildings, the Gothic Furnace of Mr. Alex. M. Lesley, of 226 West 23d street, New York, stands among the best. It is represented in our engraving, with the front brick wall removed, so as to show the interior structure. Two prominent features strike the eye, first, the prismatic iron cap D, of triangular section, which stands over the fire-box, and serves to receive the heat of the fire under it, which circulates in its interior and heats its sides, while the corrugated form of the same is very effectively radiating this heat into the air-chamber around it. In order to give this air chamber still more the benefit of the heat otherwise lost by ascending into the chimney, two bent tubes E E are placed at the sides, while the hot gases and smoke of the furnace are compelled to pass through them before reaching the chimney; these tubes therefore being also hot, add their radiating heat to that of the cap, while even the smoke-pipe, seen inside near the top, adds its share to this. It is thus seen how the heat is greatly economized in this furnace; but this is not all, even the heat of the walls surrounding the hot air chamber is economized by causing them to give some of their heat to the cold air entering the furnace, so that this cold air, by entering near the top, as seen in the figure, and passing over the furnace and downward between the double walls L L M, is already moderately heated before entering the hot-air chamber, by the openings seen below. A man-door I gives easy access to the interior of the air-chamber. For the purpose of cleaning, the curved pipes E E are provided with doors H H, which project beyond the front wall, the same as the furnace door C, and the ash-pit door below.

We ought to mention, as important details of improvements applied, the dumping-grate, which is also adapted to being shaken around its center, and will not only discharge ashes, but grind all clinkers to dust by its toothed circumference. A special kind of fire-box is also made when the furnace is intended to burn wood, of which pieces 4 feet in length can be used.

A special advantage of this furnace is that its total height is such that it can be placed in a cellar or basement with quite a low ceiling, where no other style of furnace would find room, or at least would not secure a sufficiently ascending incline for those hot-air tubes that have to be led sideways, so as to secure a draught for this hot air. Many furnaces fail in the latter respect, for the reason that parts of some of the hot air tubes are entirely or nearly horizontal below the ceiling of the cellar where the furnace is placed; in such a case the hot air will ascend by preference through the tubing having the straight upward incline, and thus heat the rooms more immediately above the furnace excessively, at the expense of the rooms situated in a more sideward direction. Now if the furnace is low, as the one here described, all the tubes may have a direction more equally slanting upward, and thus secure a more equal distribution of heat to the various rooms to be heated. As a whole, there is no doubt that this furnace secures all that may be desired from a hot air furnace—economy as well as effectiveness.

SUBSTITUTE FOR PLASTER OF PARIS.—Best whitening, 2 lbs; glue, 1 lb.; linseed oil, 1 lb. Heat all together, and stir thoroughly. Let the compound cool, and then lay it on a stone covered with powdered whitening, and heat it well till it becomes of a tough and firm consistence; then put it by for use, covering with wet cloths to keep it fresh. When wanted for use, it must be cut in pieces adapted to the size of the mould, into which it is forced by a screw press. The ornament may be fixed to the wall, picture-frame, &c., with glue or white lead. It becomes in time as hard as stone itself.

TURNER'S CEMENT.—Bees' wax, 1 oz.; resin, $\frac{1}{2}$ oz.; pitch, $\frac{1}{2}$ oz.; melt, and stir in fine brick dust.