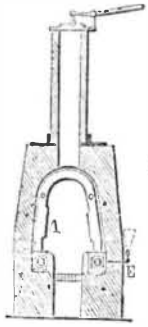


## HOT-AIR OVENS FOR IRON FURNACES.

[Continued from page 230.]

The writer has not been able to ascertain to whom is due the merit of first introducing a practical remedy for fracture in siphon-pipe ovens; but he is able to show, through the kindness of Messrs. Lloyds, Fosters & Co., a drawing of one of the first ovens erected at their works about 1840, in which this difficulty was overcome. The oven is shown in Fig. 12, and as it presents many features of marked improvement over any of those previously described, it may be referred to more in detail. In all the previously-described tubular ovens, the two legs of the pipes and the longitudinal mains were made as fast and immovable as could be effected by cast iron and solid masonry. In the present example, however, one main only was made fast, and even that was placed on cast-iron saddles, to allow of a slight rotatory motion on its own axis; whilst under the saddles supporting the opposite main A, cast-iron rollers were inserted, which permitted the main to move freely under the influence of the expansion of the siphon-pipes. This plan, by permitting the legs of the siphon-pipes to assume their natural position under expansion, was found to be a great improvement, and fractures now seldom or never occurred from the strains which had previously proved so pernicious in the former ovens.



Up to this period the only means which the furnace manager had of ascertaining whether the heat was being properly kept up was by applying a small piece of lead to the stream of blast issuing from one of the plug-holes attached to each tuyere; if the blast melted the lead the heat was considered up; if not, it was considered down. This test, however, involving a good deal of trouble, was frequently neglected; and, in consequence, the first intimation of the heat being down was seen when too late, by its effect on the working of the furnace, shown by a change of cinder or the furnace slipping. In the present case, however, advantage was taken of the lateral oscillations of the loose main, which amounted at times to more than two inches, under the influence of variations of temperature, to construct a good practical pyrometer. This is shown at one side, and consisted of a simple bar fastened at one end to the loose main passing through the brick wall, and attached at the other end to a lever working a small index, E. This answered the purpose very well; for the position of the index when the heat was sufficient to melt lead having been once ascertained, its position afterwards told at a glance the state of the oven. In some cases the movements of the loose main were communicated by a series of levers to the dampers; so that on the temperature rising beyond a certain point the expansion shut the dampers and prevented any further increase of heat, until the main had so far receded with the reduction of temperature as to open the dampers again.

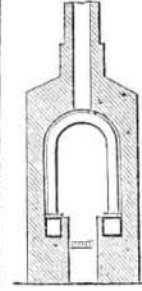
In the ovens previously described the section of the siphon-pipes was invariably circular. In the improved Staffordshire oven, however, the pipes were made of an oval section, 5 inches by 10 inside, and 1½ inches thick, whereby a very considerable increase of heating surface was obtained in proportion to the width of the pipes, without enlarging the casing of the oven or lengthening the mains. The increased height to which the crown part was raised above the grate in Fig. 12, amounting to 11 feet 6 inches, enabled the pipes now to resist the fire, which in the first trial with the low semicircular arch had destroyed them, and had thus probably led to the long discontinuance of the oval section. As a further precaution against the pipes being burned, the legs of the siphon-pipes were strengthened and protected at the point where the fire first caught them, by a thicker strip of metal cast at that part, as shown at A.

The general dimensions of the improved Staffordshire oven shown are as follows:—

Length inside casing.....	16 feet.
Breadth do. ....	7 feet 6 in.
Number of siphon-pipes.....	16
Area of heating surface, total.....	700 sq. feet.
Do. per tuyere (four tuyeres).....	175 sq. feet.
Area of fire-grate, total.....	35 sq. feet.
Do. per tuyere.....	9 sq. feet.

An oven of these dimensions is sufficient to heat the blast for four tuyeres to a temperature of 600° or 700° Fah.

Notwithstanding, however, the great improvements above described, which much diminished the number of fractures, these still took place; and singularly enough, not now on the top side of the crown as before, but on the underside. This was accounted for by the fact that the strain in pushing out the loose main was comparatively easy to be borne, being distributed over the long bend of the top side of the crown; but the underside of the bend was of the weakest form for pulling back the heavy loose main on a reduction of temperature, especially when the rollers had become clogged with an accumulation of indurated dust and clinker, as was frequently the case. A further reason also of this defect, and perhaps the more important one, was the circumstance that the iron at the underside of the bend, now subjected to tension, was exposed to the direct action of the heat, and therefore sooner lost its nature than the upper side of the pipe.



These considerations lead to a further alteration in the form of the siphon-pipe, as shown in Fig. 13, and at the same time the loose main was abandoned, notwithstanding its advantages as a pyrometer, and fixed mains were reverted to. The alteration in the siphon-pipes consisted in having the two legs made vertical and parallel for some distance above the grate, instead of inclining towards each other; and connecting them at the top by a large semicircular arch. A flat oval section of pipe was employed, though in some cases made a little wider at the back of the pipe than at the front next the fire. These pipes have been found to answer admirably; they are not apt to get burnt near the socket, as in the case of the overhanging siphon-pipes previously described; nor are they apt to crack in any part of the semicircular arch, as the strain on expansion is distributed over such a length of circumference as to enable the vessel to stand. A modification of this form of hot-blast pipe was once tried having the crown of the arch bent downwards in the middle, in the form of an inflected curve instead of a plain semicircular arch; but this proved an utter failure, the underhanging center-piece being quickly burnt down. It is mentioned here as a warning, in accordance with an observation which once fell from the first president of the institution, the late Mr. George Stephenson, that nothing was of greater value than a record of failures.

Of the various ovens described, on the rectangular tubular construction, the writer is inclined, after careful consideration of all circumstances, to give the preference to that shown in Fig. 13, in which the longitudinal mains are fixed, and the siphons have their legs parallel and united by a large semicircular arch at the top. In leaving this portion of the subject, the writer does not wish it to be supposed that he has noticed all the hot-blast ovens which have been designed up to this period; but he has endeavored to make such a selection as would enable the members to follow the various difficulties that have presented themselves with each class of oven, and to appreciate the painstaking perseverance with which, during the last thirty years, those difficulties have been encountered step by step, and gradually overcome.

[To be continued.]

## HOW TO REMOVE THE HUMAN HAIR.

The hirsute appendage has become so popular among men that there is no longer the inquiry, "How shall I get rid of superfluous hair?" In fact, the great study seems to be with them how to perpetuate its growth, and many a gallant young man, as well as gay old gentlemen (who are not Absaloms in this particular), would pay liberally for a head-wash capable of increasing the quantity and quality of the hair. Not so, however, with the fair sex; they consider the growth of hair on the upper lip, upon the arms and on the back of the neck, detrimental to beauty. Sometimes nature is a little too lavish in this respect; and many an otherwise fair one, fearing to be classed with the sterner sex, is anxious to avail herself of the most recent discoveries in science for the eradication of a useless and somewhat unseemly growth of fine hair. Our friend, Septimus Piesse, anxious at all times to aid the ladies towards perfection in their personal attractions, says those who are troubled with such physical indications of good health and vital stamina, have long had re-

course to *rusma* or depilatory for removing it. This and analogous preparations for the toilet of beauty were introduced to us from the East, *rusma* having been in use in the Persian and Turkish harems for many ages. Burnett, the botanist, says that the juice of the leaves of the *hernandia sonora* is found to be an advantageous and effectual depilatory, as it destroys the hair wherever it is employed, without pain to the skin. Knowing well how much many of our readers would value such an article we regret our inability to test the merits of this assertion, in consequence of the *hernandia* growing only in the marshy swamps of tropical America. We can therefore only suggest the mode of destroying hair by adopting the plan in use by the fellmongers for removing the hair from peltry—that is, by lime. Caustic, or quick-lime, will certainly destroy hair; but when the hair is growing upon the human skin, it requires both patience and careful application, in consequence of its action upon the skin. Take a piece of the best lime about two ounces weight, put it into a saucer, and pour on it boiling water till it slakes, spread the paste thickly over the hair to be removed, and let it remain till no longer bearable. Then take an ivory or bone paper-knife, and imitate the process of shaving; finally wash the part, and apply a little rose cold cream to allay any irritation of the skin. If this be not effectual by one operation, the process must be repeated next day, even to a third operation if the hair be strong or black. A more effectual depilatory consists of lime slaked to powder, three ounces; orpiment (sulphuret of arsenic), half an ounce; well mixed and made into a paste with water, and applied as the above. This preparation must, of course, never be used but with extreme caution. However, if there be any irritation of the skin, the application of cold cream will remove it in a few hours.

## MISS MITCHELL'S TELESCOPE AND OBSERVATORY.—

The mechanism of this telescope is probably not excelled by those manufactured in Europe. Its focal strength is between five and six feet, and the clear aperture of the object-class is five inches. It is mounted equatorially, according to the German method, and furnished with graduated circles for the determination of the positions of the heavenly objects. The circle for measuring right ascensions is divided to single minutes, but by means of a vernier reads to five seconds of time. The declination circle, by means of the vernier, reads to ten seconds of arc; but, by accompanying microscopes, single seconds may be determined with tolerable accuracy. It is furnished with clockwork on the plan of Fraunhofer, and so regulated by Professor Bond's spring-governor as constantly to counteract the effect of the earth's rotation, keeping the object in that part of the field of view which may best comport with the convenience of the observer. It has eight eye-pieces, with powers ranging from seventy-five to three hundred and fifty. It is furnished also with a filar-position micrometer of excellent workmanship. The telescope plays upon a stand, composed of slabs of iron intersecting each other at right angles, and resting on four points adjusted by foot-screws. This rests on a pier of solid masonry, surmounting a mass of granite. The base of the pier is laid so low that the severest frost cannot affect it, and the whole is isolated from the surrounding earth by beach sand, securing it from the tremor to which it would otherwise be exposed from passing carriages on a road, unpaved at a distance of fifty yards. The great Russian astronomical observer, Struve, has said that an observatory should be a covering for a telescope. Either from this precept, or from necessary economy, Miss Mitchell has constructed her observatory in such a manner as merely to shelter the instrument. On entering it, however, it is found to possess all the needful equipments of a more costly establishment. It is a circular building, eleven feet in diameter and scarcely more in height, covered with an ordinary roof made to revolve on cannon-balls. By this means, a narrow aperture in the roof is easily brought to the point of the heavens under inspection. As the chief object of Miss Mitchell is to devote the instrument to scientific work, the whole period since its construction has been employed in making those nice adjustments so necessary to useful results.—*Providence (R. I.) Journal*.

M. BERCHOLD, of Paris, has succeeded in engraving on zinc plates by the action of light alone, and his plates can be printed from as easily as wood-cuts.