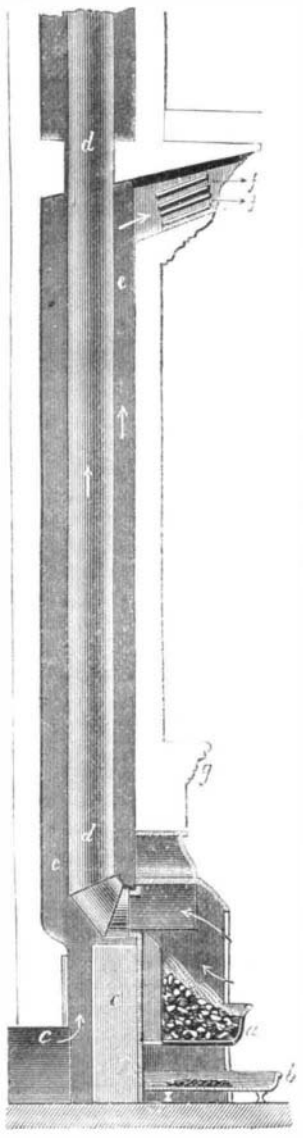
CAPTAIN GALTON'S VENTILATING FIREPLACE.

Mr. C. William Siemens, F.R.S., recently delivered a lecture before the operative classes at Bradford, England, on the important subject of fuel. The portion of the discourse under the subheading of domestic consumption was mainly devoted to advocating the use of Captain Galton's ventilating fireplace, a sectional engraving of which we herewith present. Referring to the invention, Mr. Siemens termed it "the one grate that combines an increased amount of comfort with reasonable economy, and which, although accessible to all, is as yet very little used." It is not patented.



The device differs little in external appearance from an ordinary grate except that it has a high brick back which forms the exterior boundary of a chamber, *c*, into which air passes directly from without, becomes moderately heated (to 84° Fah.), and using, in a separate flue, *e*, is injected into the room at *f*, under the ceiling. A plenum of pressure is thus established within the room, whereby indrafts through doors and windows are avoided, and the air is continually renewed by passing away through the fireplace chimney as usual. The latter, *d*, it will be noticed, is encircled by the air flues, so that the heat of the ascending products of combustion is utilized throughout its whole length. *a* and *b* are respectively the grate and ash pit, which are curved outwards slightly in advance of the mantel.

Mr. Siemens remarks that the cheerfulness of an open fire, the comfort of a room filled with fresh but moderately warmed air, and great economy of fuel, are here happily combined with unquestionable efficiency and simplicity. Such high commendation emanating from so distinguished an authority will, we think, bespeak for the apparatus more than an ordinary share of attention. It seems to us that the principle underlying its construction may lead to some better arrangement of heating and ventilating devices in our public halls and school rooms, and thus prevent many of the difficulties pointed out in our recent editorial on this important subject.

HOW GREENBACKS ARE CANCELLED.

The money received by mail comes in all sorts of damaged conditions, and has all imaginable kinds of horrible or ludicrous histories. Sometimes it has been swallowed by a calf or a goat, which, finding a pocketbook carelessly left within its reach, proceeded to regale itself with the salt which the leather had absorbed from the perspiration, until the book was forced open and the contents exposed. The green notes had an inviting and familiar appearance, and the confiding animal eagerly swallowed them, and so sealed his own death warrant; for the owner, returning and seeing the wreck of the pocketbook, rightly conjectured where his money had disappeared, put the unwilling thief to death and recovered the half digested notes. Others have been found on the bodies of drowned or murdered men, weeks perchance after their death. Frequently they have been so burned that nothing remains but the charred resemblance of notes, so frail and brittle that a slight touch will change them to cinders.

The identification and restoration of notes which have been burnt is a difficult and interesting operation. Every one has observed that a printed paper, after having been burnt, if not subjected to a strong draft or roughly handled, retains its original form, and that the printing is distinct and legible, and appears as if it had been raised or embossed on the paper, but that if it is touched never so gently it crumbles into dust. Notes in this condition are frequently received at the Department for redemption. The counter subjects each note and fragment of a note to a careful inspection in a strong light, under a powerful glass, until she determines the denomination and issue, and then pastes it upon a piece of thin, tough paper, in order that it may be safely handled. But this pasting, by destroying the raised or embossed appearance, at once and for ever precludes all chance of again identifying the kind or denomination of the note. Henceforth it is but a plain, black piece of paper, giving no indication that it ever represented money. It is therefore very necessary that the counter should be quite sure that her judgment is correct before the note is pasted upon the paper. She must also—a most difficult task—determine whether the note is genuine or counterfeit. And yet counterfeits are discovered by these experts among the charred remains of notes with almost as much certainty as among perfect notes.

The whole basement floor of the north wing of the Treasury building, at Washington, including the large room under the cash room, is occupied by these busy counters. One hundred and eighty women are engaged in counting redeemed money in this division. The work is far from pleasant, for the money is often deplorably dirty and emits the most nauseating smells.

Such labor cannot fail to be detrimental to health, especially as want of space has necessitated the crowding of the counters almost as closely as they can sit. Hence we are not surprised to see that many of the women are pale and thin, and apparently weary and careworn.

Entering the last room to which our inspection will lead us, a busy scene is presented. Messengers, each accompanied by a counter, are hastening to and fro with boxes containing bundles of money carefully strapped and labeled, while a bevy of women surround a large table which they almost screen from our gaze, but which the continual "thud!" "thud!" that salutes our ears proclaims to be the site of the cancelling machine. Approaching, we find that

FIG. 1.—CANCELLING REDEEMED GREENBACKS.

the apparatus consists of two heavy horizontal steel bars, about five feet in length, working on pivots about a foot from the ends nearest to us. To the shorter end of each is attached a punch, while the other is connected by a lever with a crank in the sub-basement beneath, which is propelled by a turbine water wheel, furnished with Potomac water from one of the pipes which supply the building. The bundles of notes, each containing one hundred pieces, are passed rapidly and dexterously under the punch by a man whose fingers seem ever just on the verge of complete destruction, but which always escape in some marvelous manner unhurt and whole. The punch savagely and easily cuts a hole in each end of each bundle. This is done for the purpose of effectual cancellation. The bundles, when all have been punched, are returned to the box, the messenger picks it up, and the counter and he hasten away to turn over the money to the clerk who is to make up the cash account of the division and ascertain whether all the money received and delivered to the counters has been returned and accounted for. From the time when the money is received by her, until it is thus delivered, the counter is responsible for it, and is required to keep it constantly within sight, except when it is locked away for the night. For this reason she accompanies the messenger who carries her box to the cancelling room, superintends the punching, and returns with the money to the clerk, to whom it is delivered, when her responsibility ends.

Just beyond the punches, a knife of formidable aspect and

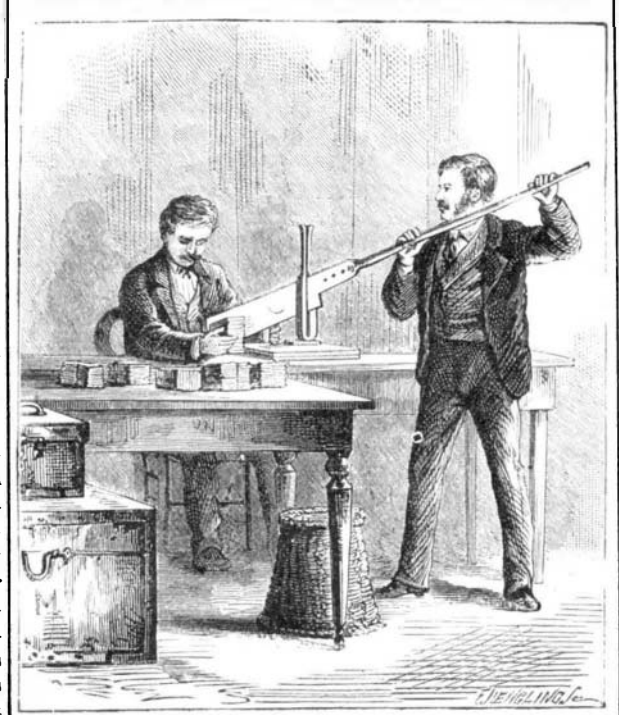
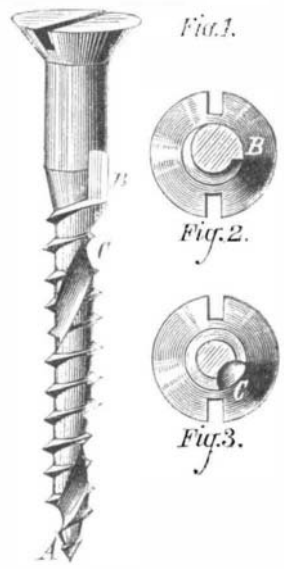


Fig. 2.—CUTTING CANCELLED GREENBACKS.

proportions is engaged in cutting the cancelled bundles in two in the middle of each note. After a sufficient quantity of money has been counted, it is made up into lots of about one hundred thousand dollars of fractional currency and proportionately larger amounts of legal tender notes, and sent in to be cut in two by this knife. The straps with which the bundles of notes are surrounded are so printed as to be also cut in two, and to show upon each half the denomination of the notes, the issue, and the number inclosed. The counter's initials and the date of counting are also written upon each end, as well as a number or letter to identify the bundle, so that if, upon recounting the money, errors are discovered, they can be traced in a moment to the proper counter, date, and bundle. One set of half notes is delivered to counters in the Secretary's office, the other to counters in the Register's office, in each of which the money is recounted. This is done as a check upon the Treasurer's counters, and for the purpose of securing as complete accuracy as possible.

IMPROVED WOOD SCREW.

Messrs. A. N. Ladd and C. N. Corning, of Concord, N. H., are the patentees of a novel and apparently useful form of wood screw herewith illustrated. The improvement consists in combining the German twist bit with the screw, in such a manner that the latter will cut its own way or hole in the wood, so as to enter the same easily and avoid splitting or other difficulty. The device may be used with the common straight bit, if desired, but the German twist bit, as shown at A, Fig. 1, is believed to be the best combination. A section of the screw is represented at Fig. 2, and Fig. 3 is a similar view of a cutter (B, Fig. 1) in the shaft of the screw, by which a hole is cut for the shaft of a larger size than is made by the bit portion of the screw. The channel or groove, C, is cut, no through the threads alone, but into the body of the screw, and retains the wood cut away by the bit.



DRAWING AND SKETCHING---PRACTICAL HINTS AND RECIPES.

We give below a number of useful suggestions and recipes relating to drawing, compiled from a variety of sources and comprising, so far as possible, the most recent improvements, as well as the plainest directions attainable, which seem to us likely to be of service to the student of the art.

In selecting a drawing board, choose wood of close grain, well seasoned, free from knots, and of even surface. Notice that the edges are perfectly straight and at right angles. A slight roundness may be given to the face with advantage in order that the drawing paper when stretched may rest tightly and flatly upon it. An apparently excellent form of board, lately introduced in the market, consists of strips of pine wood glued up to the required width with the heart side of each piece of wood to the surface. A pair of hard wood ledges are screwed to the back, the screws passing through the ledges in oblong slots bushed with brass, which fit closely under the heads and yet allow the screws to move freely when drawn by the contraction of the board. To give the ledges power to resist the tendency of the surface to warp, a series of grooves are sunk in, half the thickness of the board over the entire back. These grooves take the transverse strength out of the wood to allow it to be controlled by the ledges, leaving at the same time the longitudinal strength of the wood nearly unimpaired. A slip of hardwood is let into the edge of the board and sawn apart at about every inch to admit contraction. Its object is to make the two working edges perfectly smooth, thus allowing of an easy movement with the square.

Whatman's (English) drawing paper is generally preferred It is known by the following names, according to dimensions of sheet: Demy 15 × 20 inches, medium 17 × 22, royal 19 × 24 super royal 19×27, elephant 23×28, imperial 22 × 30, colombier 23 × 34, atlas 26 × 34, double elephant 27 × 40, antiquarian 31 × 53. Its cost for "selected best" varies from $1.00 to $30.00 per quire. Paper can usually be bought ready mounted on muslin, but the process can be easily accomplished by first tacking the cloth tightly to a frame and covering it with a coat of strong size, leaving the same until nearly dry. The sheet is then well laid with paste, in two coats, the second being applied some ten minutes after the first. The paper must lastly be placed carefully upon the muslin, patted down all over with a clean cloth, and left to become thoroughly dry before removing from the board.

In fastening paper to the drawing board, there is no necessity of soaking the sheet, as is recommended in many handbooks on drawing. Lay the paper, back up, and go over it with a large flat camel's hair brush well filled with clean water. Wet the sheet to a distance of about an inch and a half from the edges. Two applications of water are sufficient, the second being applied when the wet gloss of the first disappears. Then turn the sheet over, wet side against the board, and bend up the edges, tightly all round, against a flat ruler, afterward passing the paste brush between the turned up edge and board. The ruler is afterward drawn