

## Scientific Museum.

(For the Scientific American.)

### Philosophy for Mechanics—Lime.

Many mechanics learn to take advantage of the laws of nature by experience, without knowing to what particular laws they are indebted for success in their several arts. Hence when a failure happens—as it sometimes does—they cannot always account for it.

The natural law by which lime forms a cement with sand, appears not to be generally understood, for it is believed by many that the cement is caused by the adhesive qualities of the lime, and yet lime is but slightly adhesive in itself, for if we rub a lump of lime mortar—which has just been made up and dried—between the fingers, it will crumble like sand. But another lump of the same kind of mortar, which has been made up for a month or more, especially if it has been kept damp during that time, and then dried, will be difficult to crumble. The reason is the latter has had time to combine with a portion of carbonic acid gas, and the former has not; and as it is only upon this combination that we can depend for a good cement, the mortar should be prepared in that way which will the most readily admit the gas; for as the latter constitutes not more than the 1000th part of the atmosphere, the process must necessarily go on slowly. The lime should be made by pouring the water on it, the sand should not be too fine, nor should there be any more water in it than just enough to make the mortar work well; then the work will admit the gas, and each particle of lime and sand will become a nucleus, around which it will consolidate, and bind the whole in a firm compact mass. But when the lime is slaked to saturation by submersion, it not only takes up more carbonic acid gas from the water, by which its capacity for that element is diminished, but if much of it is used, it places the grains of sand too far apart to be firmly united together, and leaves the interstices so small that the action of the gas soon closes on the outside, by which its further entrance is prevented.

For ornamental work, however, this is the way to slake it, for it combines with a larger portion of water and is whiter as well as finer, for water when it parts with its transparency, in assuming the solid state, puts on a robe of the purest white—as in snow.

For walls exposed to the weather it is not so important, but for plastering, the sand and lime should be mixed up two weeks before it is used, and kept wet, for then the strength of the lime becomes diffused throughout the mass, and the water supplies the gas as well as facilitates its combination with the lime, an advantage that it cannot have after it is put on, and sheltered from the weather. And as it is but little more work, the hair should not be put in until the mortar is ready for use, for the wet lime decomposes it.

The thin crust which adheres so tenaciously to the backs of plastering trowels, and about the shanks of brick trowels, is a common specimen of this combination, (carbonate of lime) which is accelerated by the free exposure of those parts to the air.

Carbon in the solid state composes charcoal and the diamond, and in combination with lime—marble and limestone. When any of these substances are burned, or when timber is decomposed by time, the carbon is driven off in the aeriform state, in which it mingles with the atmosphere, to be again taken up by lime-growing trees, &c. So that the carbon liberated by the burning of Rome under Nero, may now occupy a place in modern houses, or it may form a part of those to be built long after all that are now standing shall have crumbled into ruins.

H. POLLARD.

Lexington, Mo., Aug. 7, 1854.

### The Iron Foundries in Pittsburg.

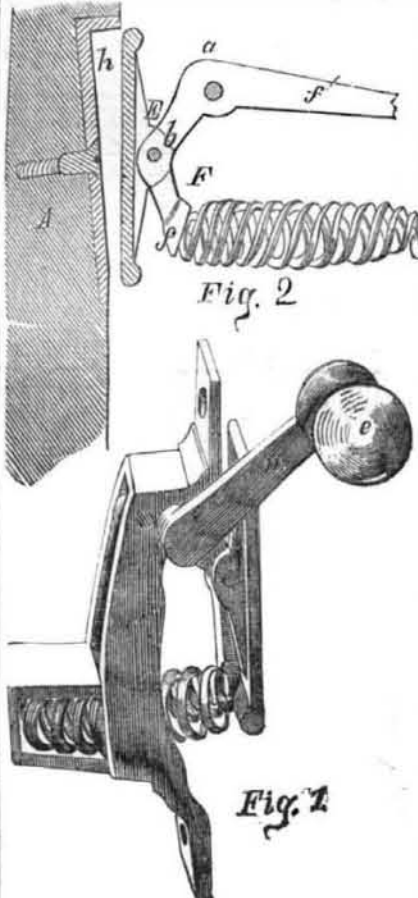
It is said there are now in Pittsburg thirty-eight iron foundries; of which nine are almost exclusively employed in the manufacture of steam engines, and twenty-nine in the manufacture of various kinds of hollow ware, ma-

chinery, &c. The foundries which are employed in the manufacture of steam engines, consume yearly 3,200 tons of wrought iron, 9,200 tons of pig, employ 640 men, and produce 120 steam-engines every year. Their net capital is \$549,000.

### Sash Stopper and Fastener.

These accompanying two figures are views of two modifications of a sash stopper and fastener for windows, for which a patent has been granted to J. B. S. Hadaway.

The nature of the invention consists in constructing a sash fastener by the combination of a rocking plate, spiral spring and levers, the plate and spring being acted upon in such a manner by a lever that the window sash can be secured and maintained at any desired point. A, fig. 1, is that part of the case of a window against which the sash abuts. In this part of the case small inclined metal plates, *h*, are set in at one or more points; these form recesses, notched at the upper part. E is what is termed a rocking plate, it forms the catch to project into the recesses in the case, and to be held therein by the tension of the spiral spring, F. *f f'* is a peculiarly formed small lever, it is secured to the plate, E, by a pivot pin, *b*, passing through ears, and is inserted into a recess in the sash of the window, or a small metal box—that is, plate E, lever *f f'*, and spiral spring, F, form the fastener, and are connected together and inserted into the sash, with the rocking plate opposite that part of the case in which the notched plates, *h*, are inserted. When the window is in its place, and

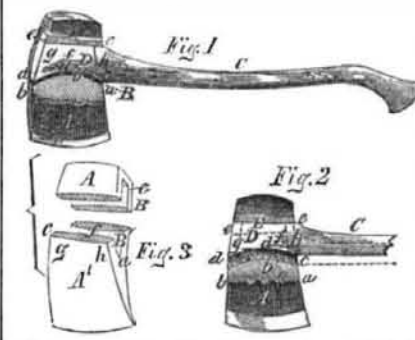


the fastener secured in the sash, the tension of the spring, F, pushes the plate, E, to make it take into the recess formed by the plate, *h*, and prevents the window from being moved. There is a pin inserted into the lever, *f*, at the point, *a*, forming the fulcrum of the lever part, *f'*. By depressing the lever, *f*, by pulling on the lever arm, *f'*, the upper part of the plate will be made to assume the flush position now shown, and allow the window to be raised. There is a small handle with a small cam head inserted into the sash, for elevating and depressing the arm, *f'*, to raise the window. The spring, F, keeps the plate, E, in place in the recess. Fig. 2, is a form of fastener to be placed in the case or frame, the recess plates like *h* being placed in the face of the sash. *e* is a handle, and E is the rocking plate to press into the recess, *h*, like fig. 1. The lever of the handle, *e*, forces the spring back from pressing the plate, E, into the said recess, and thus relieves the stopper so as to move the window up or down. The face of plate E is lined with leather or india rubber, to prevent marking the inside face of the window frame.

More information of this invention may be obtained of W. S. Hadaway, of Chiltonville,

Mass., whose advertisement will be found in another page.

### Securing Helves on Axes.



The annexed figures represent an improvement in securing helves in axes, for which a patent was granted to Horatio N. and Jeremiah Bill, of Willimantic, Windham Co., Ct., on the 5th of July, 1854.

Figure 1 is a perspective view of an axe and helve, made and connected together—a portion of the metal forming the eye of the axe being broken away to show more clearly the construction of the helve and the eye of the axe; also the manner in which the helve is fitted and secured in the eye. Fig. 2 is a side elevation of the same; the metal forming the eye is broken in a similar manner to figure 1. The helve is in the position it occupies when it is first inserted, and before it is wedged in. The dotted lines show its position when wedged in. Fig. 3 represents the axe, it being divided transversely through its eye. These views show the peculiar shape of the eye of the axe. The same letters indicate like parts on all the figures.

A is the axe; B is its eye; C is the helve. The eye and the helve part that enters it are of a peculiar form. The bottom of the eye is made convex as at *a b b*; the lower part, D, of the helve, to fit in it, is made concave, and rounding at *c d d*, so as to correspond to the shape of the eye at *a b b*; the object of thus shaping the lower part of the eye and helve is to give the latter a greater bearing. The eye is made of a tapering wedge-shape—its narrowest part being at *a f*, and its widest part at *e*; the helve corresponds to this, but is not quite so wide at *e*, it being made narrower so that it may be easily inserted and then forced down to the bottom of the eye and wedged tightly by a tapering key, E, as shown in fig. 1, and in dotted lines fig. 2. In fig. 3, it will be observed that the eye of the axe is made narrow near the center of its length, or that the inner walls of the eye are made convex, and nearly meet at *f*, and from this it gradually enlarges towards the top, and back and front edges of the axe, and it decreases in width from *f*, between the points *g* and *h*, towards the lower cutting edge of the axe. The part, D, of the helve is made concave from its upper to its lower edge, and between the points *g* and *h*; and in all other respects to suit the eye, B.

In inserting the helve, the upper part of the edge, D, is kept nearly in contact with the top of the eye, as shown in fig. 2 in full lines, so that it may be inserted with ease. The helve being placed in the eye, as shown, it is forced down towards the bottom of the same, and made to occupy the position shown in fig. 1, and in dotted lines, fig. 2. The tapering key, E, is then driven in, and the helve forced down securely into position. When the helve is thus wedged in, the whole surface of the two side of the part, D, bear against the metal of the axe, and the thickest portions of the helve stand below the point, *f*, and in front and behind the same. Owing to the eye being made tapering from *f* down to its bottom, and gradually enlarging from this point towards the front and back edges, it is evident that it will not be possible for the helve to be drawn out by force except the metal round the eye breaks away, or the wedge be first withdrawn. This plan admits of the parts being made as strong as necessary, and easily put together and taken apart, which is not the case with the present method of securing helves in axes.

More information may be obtained by letter addressed to the patentees.

### A False Patentee.

We learn by our Philadelphia cotemporaries, that an inventor in that city has been brought before the Alderman's Court, and held to bail for selling the patent right for an invention of a James' locomotive safety bar, for which no patent has ever been granted. The object of the invention was to prevent damage to cars in cases of collision. The prosecutor was John G. Collins, an engineer who made the drawings of the model, for which he was paid in a certificate of a share in the patent of \$25.

### LITERARY NOTICES.

BARNUM'S AUTOBIOGRAPHY is really about to appear, some extracts having already been published in the "Bridgeport Standard." We have some idea of what it is likely to be, as Barnum has passed through almost every phase of life and has humor and social feeling woven into every tissue of his nature. He has genius enough to make a book, and given in his own peculiar style, it will form at once an attractive and instructive volume.

THE LONDON QUARTERLY REVIEW—The last number of this able Review has just been issued by its enterprising publishers, Leonard Scott & Co., No. 79 Fulton street, this city. Its leading article is on the House of Commons, and is very interesting. It asserts that eloquence is almost unknown in the British Parliament. Some of the most conspicuous characters, such as Disraeli, Lord John Russell, &c., are described. It is a most excellent number.

BLACKWOOD'S MAGAZINE—The same publishers have promptly issued "Old Ebony," the King of magazines for August. It contains the best account yet published of the recent successful insurrection in Spain. Another article on the ethnology of Europe is well worthy of perusal by every person who wishes to be posted up in the natural history of man.

THE ILLUSTRATED NEW YORK JOURNAL—Published by P. D. Orvis, 130 Fulton street, New York. The number for September contains several fine engravings, the most interesting being those of Cronstadt and Sebastopol, the most celebrated fortified cities in Russia. The tales, sketches, poetry, and miscellany are full of interest. Yearly subscription, \$2 per annum.

PUNYAM for September. The present number of this excellent original magazine is illustrated with a fine steel plate of the author of "Swallow Barn," Hon. J. P. Kennedy. There are eighteen original articles, equal to any in the most celebrated magazines of the old world.

THE NATIONAL MAGAZINE for September contains an engraving of Donald McKay, the celebrated ship builder, also pictures of scenes in Russia and Turkey. The series of illustrated articles in the life of Martin Luther are interesting. This magazine abounds in good reading and fine engravings, thus forming an elegant work. Carlton & Phillips, publishers, N. Y.

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