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Heat-Conducting Power of Metals.

Professor Grace Calvert and Mr. Johnson, of England, have been for some time engaged in a series of experiments to determine the relative heat-conducting power of metals in a perfectly accurate and reliable manner, in order that a standard might be obtained from which calculations could in future be made, as the present recorded numbers are varied and uncertain. Their results we publisb, although we do not fully endorse them, for we believe that the power of any metal to conduct any one of the forces depends more upon its molecular arrangement than upon its other metallic characteristics, and that until the physical differences in bodies of the same chemical composition are understood and explained, no true standard can be acknowledged.

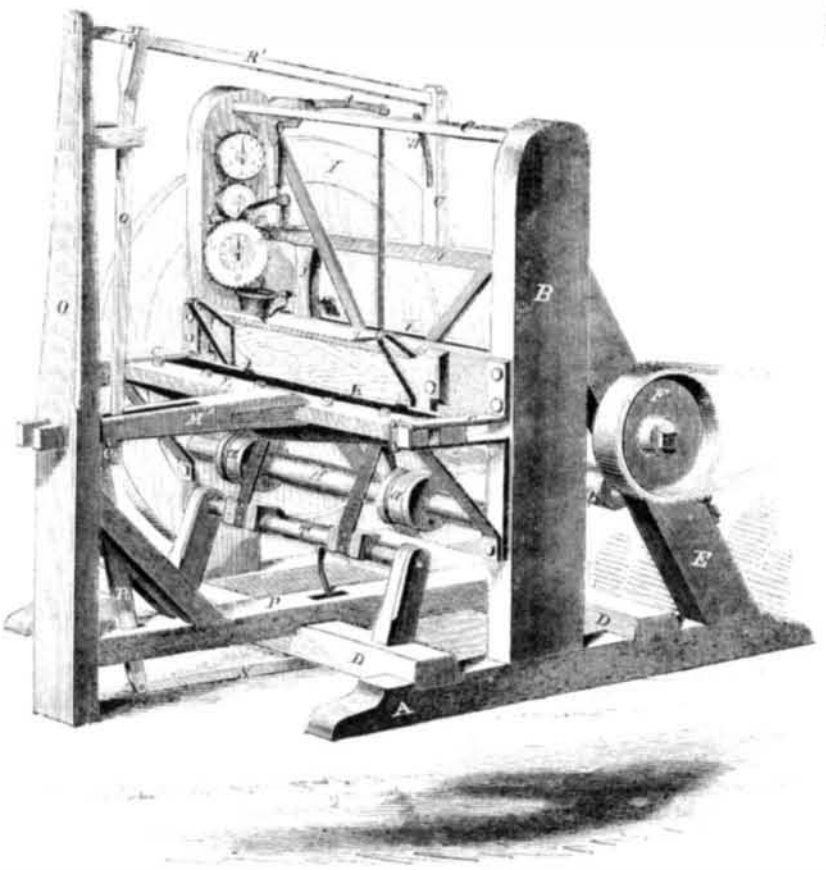
The relative conductibility (taking silver at 1000) of the several metals is—gold pure, 981; gold with 1 per cent of silver, 840; copper rolled, 845; copper cast, 811; mercury, 677; aluminum, 665; zinc rolled, 641, zinc, cast vertically, 628, zinc, cast horizontally, 608; cadmium, 577, malleable iron, 436, tin, 422; steel, 397, platinum, 380, sodium, 365, cast-iron, 359, lead, 287, antimony, cast horizontally, 215, antimony, cast vertically, 192, bismuth, 61.

Australian Quartz Mining—Smelting.

We learn from our very able exchange, *The Colonial Mining Journal*, (Melbourne), that a Mr. J. McBean, of that city, has brought forward a method of gold quartz smelting, which has been several times presented to us for fusing sand and alkalies to make glass by the heat of the sun. It consists in employing the old means whereby Archimedes set a Roman fleet on fire at Syracuse, in Sicily, namely, *burning glasses*, and we are told that a company is in the course of formation to test the invention. There is nothing new in the idea of applying *lenses* to concentrate the sun's rays; but this application of them to the fusing of gold quartz is entirely novel. At the same time, we must say it is impracticable in every sense. Quartz is too refractory to be melted by such an agency; the diamond has been set on fire with a powerful lens, but we are not acquainted with a single instance of quartz being melted by such means.

Quartz-mining has become very common in Australia, the steam-engine being employed for operating the stampers and other machinery. Experiments have been made in calcing the quartz in a furnace prior to crushing it, but the expense is stated to be greater than by the old method of stamping the quartz direct from the mine.

PEFLEY'S LATH MACHINE.



The subject of this engraving is a lath-machine, which not only cuts the laths from the bolt, but also registers the number cut and gives warning when a certain number have been rived off, and it is automatic in its feeding and discharging arrangements. By reference to the engraving the following description of the operation will be understood.

The bolt is made the proper dimensions and its ends are placed in guides, and power being applied to the wheel and shaft, F, a reciprocating motion will be given to the knife, K, by means of rods and eccentrics. This knife is attached to a bar, L, that moves in guides, *c*, The small rods, *k k*, also have a reciprocating motion imparted to them from the shaft of F, which operates the swinging frame, X J V, to which they are attached. The knife works in line with the lower edge of the bar against which the bolt is placed, and when the knife moves outward from the bolt, the small bars, *k*, follow it and hold up the bolt, and they remain in that position until the knife comes back to the bolt and cuts off a lath the thickness of the distance between its edge and the top of the small bars, *k*. The laths fall by guides, as they are cut, on to endless bands, *a*, that pass round pullies on the shafts, H G, and are conveyed away. The bolt feeds itself by its own gravity, and when one is nearly cut up another is laid upon the top guides with the best edge down, to prevent the cutting of any bad laths, and the instant the good wood is all cut up, the operator should move the lever Q, forward, as the knife withdraws, and by this movement through R' and U, the vibrating frame, V J X and consequently the bars, *k*, are withdrawn from under the bolt which drops away; the guides also being operated by a lever, R, connected at *e* to a link, S, and a vibrating center, T, on which they are placed, so as to throw the bolt away from the good laths. The bars, *k*, fall back to their proper position by the spring, W, when Q is released.

The numbering and registering device consists of three wheels A', with indexes on their faces and teeth on their periphery, the lower one indicating units, the next hundreds and the third, thousands; a pawl, *s*, attached to the frame, V, moves the wheels, and it is allowed to remain in contact with the teeth by the bolt pressing against a little catch, *u*, that by a link releases the lever, *t*, and so allows the registering device to work, and the same lever, *t*, when there is no bolt in the machine elevates *s*, and no matter though the machine be moving, if it is doingno work none is registered. When a hundred laths are cut (the required number to form a bundle) a small bell is struck, so that the workman has only to take up all that are on the belts, *a*, and he will be sure to have the right number. The knife, K, is prevented from shaking, by a bar, M', that works through slots in the upright, O, it being attached to the back of the knife bar, L. The upright, O, is connected with the main frame, A B C D E, by a piece, P, and suitable stays or straps.

This machine will cut laths of any length to suit the different spaces in buildings, and as it rejects the bad timber without cutting it, time and wood are thus saved, and we hear from persons who have seen it in operation that it is in every way an excellent and economical device. The inventor is Jacob Pefley, of Bainbridge, Ind., from whom all furtherinformation can be obtained. It was patented Dec. 28, 1858.

Howell's Homogeneous Metal.

This new form of the useful metal, iron, is coming into very general use in Great Britain, and deserves the attention of our own countrymen. We have on various occasions mentioned it, but as we bad the other day an opportunity of witnessing a practical test of its vast suporiority in point of toughness and flexibility over other forms of iron, we wish to record the fact. The articles were drawn tubes of two, three and four inches in diameter, of only half the thickness of wrought iron tubes of the same diameter, and we saw their ends hammered in, cold, from opposite sides, and again at right angles, until a perfect cross-lap was formed, the tube being closed up at the end, and there was no sign of a crack or flaw in any part. With great difficulty we had a two-inch tube broken, and carefully examined the arrangement of the particles of the metal. It seems neither positively crystalline or positively fibrous, but is an even structure, the particles being laid closely to each other, well meriting the name of "homogeneous metal." A broken sheet and bar that we examined presented the same characteristics—an equality in the arrangement of the particles, and an equal toughness in every part—which peculiarly fit it for all purposes where lightness and strength combined are required.

An Invention Wanted for Australia.

MESSRS. EDITORS:—There is a great want in our mining districts of a pump for the purpose of draining our deep quartz claims, from 200 to 300 feet deep, to be worked from the top surface of the ground. Almost every known combination of force and suction pump has been tried here, but none of them have given satisfaction.

We do not know that such a pump can be constructed by even American genius, but we would like to see your countrymen turn their attention to an article so much needed here. Their success would insure them a fortune here.

We propose, if you can secure such a pump, to take out a patent here at our expense, and introduce them throughout these colonies, taking one half profits, and we will furnish the capital for their manufacture either here, in England, or the United States. Will you give it your attention?

Yours, respectfully,
FISHER, RICARDS & Co.

Melbourne, Australia, Feb. 15, 1859.

[We received the above letter a few days since, *viâ* Marseilles and London. We present it without comment.—EDS.

New Cement Wanted.

The shells of pearl-oysters and such other fish exhibit the most beautiful colors and brilliant polish, and at the same time they are exceedingly hard and durable. These shells are manufactured by the creatures whose houses they form, and the materials of which they are composed were no doubt once in a cold pasty condition, and gradually became indurated. Will art ever be able to rival these humble works of nature? Such an accomplishment is by no means impossible. A cement which could be applied in a cold liquid state, and become hard and shining as polished marble would be a great acquisition to the useful and ornamental arts. Such a cement could be employed to coat the walls of houses, inside and out; to ornament furniture, line cisterns, and to a thousand other purposes. The composition of shells is carbonate of lime and isinglass. Who will be the first inventor to imitate those little creatures of the sea in the discovery of a composition which will be equally as beautiful and enduring as the interior of a pearl-oyster or the exterior of some species of snails?

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