# Science and Art.

### Copper; its Nature; Babbitt Metal.

Many persons suppose that those bearings for the shafts of locomotives, and heavy machinery, which are generally called "Babbitt metal," embrace a peculiar patent alloy. This is not so; the name is incorrect. The patent is not for the metal or composition of the boxes, but the method of making them. They are composed of a hard case or shell, such as iron, and are lined with a soft metal which forms the shaft bearing. The hard shell or case prevents the soft metal from being squeezed out by the pressure of the journal. Such boxes, by the use of the soft metal bearings, such as composition of lead, tin, and copper, cause less friction than if the bearings were of harder metal. We have been given to understand that such boxes were employed in the Staten Island Print Works in 1833.

An eloquent writer, one apparently well acquainted with his subject, thus describes the nature of copper, in a recent number of the *North British Review*:—

"Let any one who has a slide lathe at command—furnished with drills, and the other usual appliances—try his hand, for example, on a mass of copper. How queer a temperature does this metal show when you would apply tools to its idiosyncrasy; try to drill it; try to file it; try to cut it; try to plane; try to planish; roll it out, or stretch it over a mandril. These things—all of them—may indeed be done; but with what care and choice of means are they to be effected. In one case you must soothe the surface with oil, or with tallow and wax; in another, the least smear of oil causes it to "buckle up," and all is spoilt. Under one operation, a bathing with milk is good; in another, a touch of the workman's saliva is more effective than anything else.—The tool you apply to it must be neither hard nor soft beyond the limits of straw tempering. But now anneal it; how kindly, after coming forth from the furnace, does it yield itself to the workman's will, but if you indiscreetly strike it with a hammer for a few times only, then, and as in an instant, you find that the molecular constitution of the entire mass has undergone an instantaneous transformation, and it has become sonorous, elastic, non-plastic."

In the two articles on "Copper and its uses," which have appeared in our columns, we would correct the word *many* in the first article alluding to the ores of our country sent to Swansea, and substitute the word *some*. We know that very little of our copper ores go to England; almost all are smelted at home. The mining of copper and its ores is very toilsome and expensive. Blasting is out of the question in pure copper lodes, and the ore rock is exceedingly hard to penetrate.—Copper will always be a dear metal, unless some great improvements in the art of mining be discovered.

### Important about Milk.

The *Western Agriculturist* contains the following, which appears to be useful and sound experimental knowledge relating to milk:—

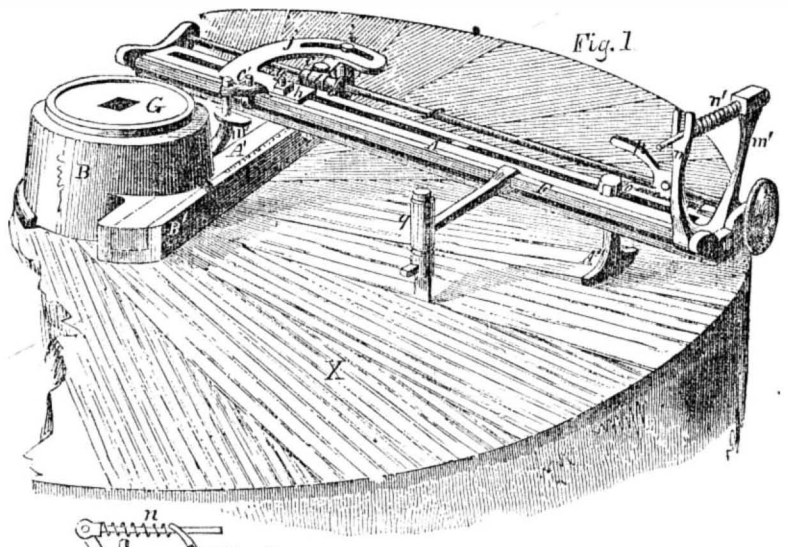
"Cream cannot rise through a great depth of milk. If, therefore, milk is desired to retain its cream for a time, it should be put into a deep, narrow dish; and if it be desired to free it most completely of cream, it should be poured into a broad, flat dish, not much exceeding one inch in depth. The evolution of cream is facilitated by a rise, and retarded by a depression of temperature. At the usual temperature—50 deg. Fah.—all the cream will probably rise in thirty-six hours, but at 70 deg. it will, perhaps, rise in half that time; and when the milk is kept near the freezing point the cream will rise very slowly, because it becomes solidified. In wet and cold weather the milk is less rich than in dry and warm, and on this account more cheese is obtained in cold than in warm, though not in thundery weather. The season has its effects. The milk in spring is supposed to be the best for drinking, hence it would be the best for calves; in summer it best suited for cheese; and in autumn the butter for keeping is better than that of summer; the cows being less frequently milked give richer milk, and consequently more butter. The morning's milk is richer than the evening's. The last drawn milk of each milking, at all times and seasons, is richer than the first drawn."

### Telegraph for Preventing Collisions.

The Montreal *Pilot* states that Mr. McLaughlin, of Quebec, has invented an instrument by which two trains approaching each other upon a railway can be fully warned of their danger. Upon the mile posts along the road side are dial plates with an index, connected with a telegraphic wire extending the whole length. A train starts, and the first car as it passes each post, touches a portion of the instrument, and causes the pointer to move to a number indicating the mile at which the train may then be.

A similar method of making the locomotive thus operate a line of signals on a railroad, has been proposed to us a number of times by correspondents. Supposing something should go wrong with this telegraph as well as the locomotive, what then? An independent electric telegraph is the best.

## IMPROVEMENT IN DRESSING MILLSTONES.




Dressing Millstones.

The invention illustrated by the accompanying engravings is designed for the purpose of re-grooving or threading the faces of millstones, used in grinding flour. After the stones have been in use for a time the grooves become worn down or dulled, and must then be renewed. To chisel them out by hand would be a long and tedious job, yet it is only within a few years that mechanism has been taught to do the work.

The apparatus here described is provided with a sort of hub or head piece, B, through which the mill spindle passes, the picking machine resting upon and revolving with the stone. When the upper stone is to be dressed it is turned over face up, and made to revolve. The motion of the spindle operates the picking apparatus, and cuts the necessary threads or grooves.

This machine is specially intended to cut parallel furrows, although, by a slight change, it will cut in exactly radiating lines, if desired. The pick hammer, *q*, is operated by a peculiar cam, which is put in motion by the mill spindle. The cam is so arranged as always to impart a uniform force to the pick hammer. A very convenient combination of parts exists whereby the force applied to the hammer may be instantly increased or diminished; there is also an excellent method of shifting the banner from one thread to another, regulating the distance, depth, width of the furrows, &c.

Having alluded to some of the uses and advantages of the invention, we will now describe its parts. Fig. 1 is a perspective view, showing the apparatus applied and ready for use on a mill stone; fig. 2 is a side section; similar letters in both figures refer to the same parts.

The bed piece, A, which carries the pick shaft, F, is attached to a sliding piece, A', which is fitted to slide in a straight grooved way, B', which is arranged tangentially to, and permanently attached to the head piece, B. This sliding piece carries a short upright shaft, *c*, provided with a loose pinion, *a*, which gears with a fixed rack, *b*, on one side of the way, B', and to this pinion is secured a bevel gear, *d*, which gears with another gear, *e*, on a shaft, *f*, which is arranged parallel with the bed, A. The bed, A, is supported partly by the sliding piece, A', and partly on a small standard, A'', near one end. By turning the shaft, *f*, by hand, rotary motion is given to the bevel gear, *d*, which through the pinion, *a*, and rack, *b*, gives a longitudinal movement to the sliding piece, A', and in this way, after a straight furrow or thread has been made by the movement of the pick along the shaft, F, the bed, A, with the pick, can be moved to make a new thread or furrow without turning the head piece, B, thus keeping the pick shaft in a parallel position, and producing parallel threading.

In order to enable the direction of the threading to be varied, the bed, A, is made movable on a pivot, *g*, which is secured in the sliding piece, A'. When adjusted at the required angle to the sliding piece, it is secured partly by a nut, *h*, on the pivot, *g*, and partly by a screw, *i*, which passes through a slot in a stay, *g*, attached to the bed, and screws into a small post, *k*, on the slide. The bed, A, is slotted longitudinally in order to enable it to be adjusted in that direction upon the pivot, *g*, and to enable the pick to work on either side of the head piece, B. The stay, *j*, must not move longitudinally with the bed, and therefore it is made detached, and fits to the longitudinal slot of the bed with a feather, *r*, which gives it rigidity laterally.

In order that the feed movement of the sliding piece, A', may be produced in all positions of the bed, A, and the shaft, *f*, the bearing, *b*, of the shaft is carried by the upright shaft, *c*, which turns freely as a swivel with any movement of the bed on the pivot, *g*. The bevel gear, *e*, fits to the shaft, *f*, with a feather and groove, to allow the shaft, *f*, to slide to admit of the longitudinal adjustment of the bed, the hub of the bevel gear being the immediate bearing of the shaft, and the said hub fitting to the swivel bearing, *l*, in the shaft, *c*. In order to operate the pick shaft, F, from the cam, G, which fits to the top of the mill spindle, in an effective manner, in all the changes of position of the sliding piece, A, and at the same time to preserve an uniformity of the force of the blow, the cam, G, is inverted, and a secondary lever, *m*, is applied between the said cam and the arm, *c'*, of the pick shaft, to throw up the said arm, and lift the hammer. The fulcrum, *m'*, of this secondary lever is attached to one side of the sliding piece, A', so that the lever must always bear the same relation to the said arm, *c'*, and the said lever crossing the cam on one side of its center, is capable of having a very considerable longitudinal movement without changing its effective relation with the cam, owing to the enclosed projections, *s s*, of the cam being of the same hight from their innermost to their outermost extremities, as is shown in fig. 2.—To increase and graduate the force of the blow of the pick, a spiral spring, *n'*, is applied to act upon an arm, *n*, on the pick shaft, the said spring being wound round a rod connects with a lever, *m''*, which is adjustable by means of a wedge attached to a rack, *o*, which is moved by a sector lever, *p*, to throw the wedge more or less under the lower arm of the lever, and thus throw the upper arm more or less forward to give more or less force to the blow.

This invention is ingenious, but simple. It saves a large amount of labor, is easily managed, and its cost of construction is not great. It ought to become a general favorite among millers. The improvement is the invention of S. W. and R. M. Draper, of South Dedham, Mass., on which an application for a patent is pending. For further information address the inventors as above.

### American Cotton Manufacturers.

The New Orleans *Picayune* states that five thousand bales of cotton were recently shipped from that city to Boston on the *Isaac Boardman*—the largest cotton cargo ever sent to Boston. Another vessel,—the *Merrimac*—cleared at the same time for Boston, with 3600 bales. Other ships were loading with smaller quantities for the same destination, thus showing that the New England factories were doing, or are about to do, an active business.

The Newburyport (Mass.) *Herald* states that there are in that county 22 mills, with 244,073 spindles, consuming in a year 14,426,605 pounds of cotton, producing goods to the value of $6,000,232, and affording constant employment to 5235 operatives—1549 males, 3686 females.

There is further, at Lawrence, a de laine establishment, in which 200,000 pounds of cotton are used, or about one-third of its raw material, where 300 persons are employed; and at South Danvers there is a cotton bleachery that has a capital of $150,000 and employs 60 hands.