



Philosophy of the Barker Mill.

MESSRS. EDITORS:—On page 20, Volume XI. of your excellent journal is a description of a small Barker-mill engine. Though the construction of this mill is well known, the true principle of its action, I think, is understood by comparatively few. It is generally supposed that the reaction of the surrounding atmosphere or water on the issuing jets produces the motion, but a few experiments with the air-pump will explode this theory. Let the mill be placed under the receiver and the air be exhausted. There will then be no medium for action; but if the air is admitted through the mill, it will start with as great force and speed as if under 15 lbs. of steam.

The true principle I think is this:—As a motive power we have a fluid pressing externally with equal force in all directions. By making a small orifice in one side of the arm, we remove so much of the pressure in that direction, while the pressure still acts with full force in the opposite direction and produces motion.

A recent English work on "Mechanical Engineering" speaks of the hydraulic propeller which evidently acts on this principle, and yet the author attributes the motion produced to the reaction of the air or water on the jets issuing from the propeller. This propeller would doubtless work as successfully in a vacuum as the Barker-mill.

H. FORD.

Utica, N. Y., July 8th, 1864.

The Way Saws are Straightened.

MESSRS. EDITORS:—Permit me to correct your reply to "P. D. G., of N. Y.," on page 13, current volume of the SCIENTIFIC AMERICAN. The writer, as well as the other members of our firm, is a practical saw-maker. Circular saws, 6 by 12 inches face, slightly convex, are straightened on an anvil by hammers weighing from 8 to 10 lbs. One hammer is used for this purpose which is called the "cross-faced hammer." It strikes a blow one inch long and three-sixteenths of an inch wide. With it we work on the high places and twists of the plate. The other we term the "round-faced hammer," which makes a blow in shape and size of a five-cent silver coin (if you can recollect that!), to stretch the steel in whatever way needed to stiffen [straighten?] the saw after being buckled. There is such a machine as you describe, used by Waterman, of Brooklyn (E. D.), N. Y., to *chill* saw-plates, after which he straightens them as above.

WOODROUGH, MCPARLIN & DUNN.

Cincinnati, Ohio, July 9, 1864.

Stage Scenery.

In the new drama of "AMASIS, or, the Last of the Pharaohs," of which our readers perhaps have seen notices in the various journals, a decided improvement has been adopted, much simplifying the usual manner of moving or shifting stage scenery. The old cumbersome "flat," with frame, is entirely done away with, the canvas being stretched in one entire sheet over the stage at the entrance, where the scene is used and disposed of on cylinders. This obviates the necessity of having an ugly crack running up and down the center of a scene, as is now the case in nearly all our theaters where flats or frames are used, and which always mar a scene, no matter how beautifully executed. Another advantage this mode has, is in economizing space behind the scenes, which is a very great desideratum, especially in small theaters and contracted stages; the scenery can be stored away in one-sixth the space occupied in the old way. The saving, in dispensing with the expense of frames, is also very important, especially to managers whose houses and treasuries are not very full. The invention is from the prolific brain of the celebrated Banvard, who has painted the scenery of "Amasis" in a most magnificent manner from sketches he made for the purpose while in Egypt, where the scene of the drama lies. We believe, also, it is the first attempt, either in this country or Europe, to present correct scenery of the very localities represented in a drama. We hope soon to have the pleasure of witnessing the

drama of "Amasis," with its new mode of working scenery, at some of our Broadway theaters.

Action of Secretary Welles on the "Chenango" Disaster.

The jury empanelled on this case say:—"The men met their death from scalds and inhalation of steam on board the United States gun-boat, *Chenango*, by the bursting of one of the boilers, which was caused by a greater tension exerted on the boiler than it could bear, the result of imperfect bracing.

"The stays of the boiler being 64 in number, and attached to the tube boxes by 32 lugs, whereas the drawing calls for 64 braces attached to the 64 lugs; thereby reducing the strength of the bracing to about one-half of that shown in the drawing; also doubling the chances of rupture if a stay by carelessness should be left out; and the jurors consider the inspector of such boiler highly censurable, as they conceive it was his duty to have reported to his immediate superior when so vital a change as this had taken place in the construction of this boiler."

In consequence of the verdict in this case, Second Assistant Engineer S. Wilkins Cragg, the officer who inspected the boilers of the *Chenango*, is dismissed from the service, and will, from this date, cease to be considered as an officer of the navy.

Whatever differences of opinion may have existed among the members of the jury as to the particular causes of the explosion of the boiler of the *Chenango*, they were unanimous in their decision that the boiler was not constructed in conformity with the drawings and specifications, and that there was great fault in the staying.

There is, therefore, no excuse for the inspecting officer in this case, nor can there be in any, where defective work, or work not in conformity with the drawings and specifications, is not reported to the proper officer, or to this Department.

The disastrous effects of such negligence of duty, as shown in the case of the *Chenango*—the possible consequences in a national point of view, of permitting defective or unreliable vessels to be introduced, by fraud or negligence, in the naval service—will render it incumbent upon the Department hereafter to visit with the utmost rigor of the law any neglect of duty or faithlessness on the part of either inspecting officers or builders.

GIDEON WELLES, Secretary of the Navy.

[The verdict is in exact accordance with the views expressed in the SCIENTIFIC AMERICAN long before the deliberations of the jury were ended.—EDS.]

INGHAM UNIVERSITY.

This institution, in its present prosperous and affluent condition—in its extensive buildings, grounds, library and apparatus—is a beautiful illustration of what woman, in her appropriate sphere, can do. Two sisters, whose name it bears, thirty years ago, without means, without influence, yet with an earnest resolve to do something for the benefit of their sex, and raise higher the standard of female education, planted the germ of this institution at Le Roy, N. Y. They watched, they watered it, and every successive year they have witnessed its growth and expansion, until now it is "an institution" indeed, a veritable university, with a university charter and powers as much so as Oxford or Cambridge; and those who complete its regular curriculum of study receive their degree and diploma as proof of their fidelity and scholarship.

It was our good fortune to attend its recent anniversary and commencement, and it is not our partiality for the fair sex that leads us to say that we were never better pleased, and never have we known examinations, in all the higher branches of science and mathematics better sustained. The mysteries of the calculus of conic sections, to these young aspirants for university honors, seemed as familiar as household words, while you would have supposed that Virgil and Homer and Herodotus were among their favorite authors. The fact is, we were surprised, and our old notion that woman could only skim the surface, and must be content with the ornamental, the esthetic, the mere poetry of an education, was fully displaced by the sober conviction that woman has equal powers of acquisition with us of the sterner sex, and may often bear away the laurel of successful competition. The compositions of the graduating class were of a high order, in point of strength, finish, and

originality, and were read with a tone and emphasis which, in effect was truly eloquent.

The interest of the occasion was greatly enhanced by the circumstance that the new Chancellor, the Rev. S. D. Burchard, D. D., of New York, was to be inaugurated; and the friends of the institution from the surrounding villages and cities were present, anxious both to see and to hear. The day was pleasant, though warm, and the large hall or chapel of the University was crowded to its fullest extent. The people were not disappointed—the music, the service, the charge to the new incumbent and his own address, were all appropriate, highly satisfactory and worthy the occasion.

Dr. Burchard is the well known and highly esteemed pastor of the 13th-street Presbyterian Church, of this city; and we are happy to learn that his new relation will not call him from his old friends and field of labor. His residence, as before, will be with us, but he will be expected, once a year, at least, to visit Le Roy, and take a paternal interest in the institution, presiding at its board of council and on the day of commencement.

Degrees were conferred upon eight young ladies, members of the senior class, by the Chancellor, who addressed them out of the fullness of his heart, in a most touching and beautiful manner; the degree of D. D. upon Rev. Josiah Crofts, of the Established Church, York, England, and upon Rev. Wm. L. Parsons, who, with his excellent lady, is to be hereafter connected with the institution at Le Roy.

COST OF PATENTS.

Although the prices for almost every kind of produce, merchandise, labor or professional service, have been greatly increased during the past few months; and although many of the patent agents throughout the country have advanced their charges nearly double, the many friends and patrons of MUNN & Co. will be glad to learn that we have not yet been compelled to augment our rates for obtaining patents. Nothing, however, but our immense and increasing run of business has enabled us to maintain the old prices, for in common with everybody else we are obliged to pay more than double former prices for drawing-paper and all kinds of materials used in our business.

We have always endeavored to preserve in our establishment the means and capacity for doing much more business than is ever likely to present itself during a given period; so that our increased expenses consequent upon increase of business are chiefly confined to the additional materials consumed.

We are now obtaining from one-third to one-half of all the patents that are granted in this country; and our business facilities are such that we could without any difficulty prepare all of the applications that are filed at the Patent Office. This is the aim that we now have in view; and if the public confidence in our efforts continues to increase as rapidly in the future as it has in the past, our aims will ere long be fully realized. Nine-tenths—almost all—of the patents now secured in foreign countries, by American citizens, are obtained through the SCIENTIFIC AMERICAN PATENT AGENCY; and we intend soon to secure the same ratio in respect to home patents. There are a number of small patent agencies scattered about in various sections, who eke out a scanty subsistence by decrying our extensive efforts to serve the public. They tell the credulous that we attend to so much business that we cannot do it well, etc.

Now the truth is, we execute all forms of patent business in the most superior manner, simply because we have so large a share of it to do. We are enabled to employ the very best talent which the world affords, and the question of the expense is to us a secondary consideration. We not only intend to do the largest share of business but it is our highest pride to execute it in the best manner. The corps of writers and draughtsmen at this moment employed in the SCIENTIFIC AMERICAN Office is unequalled in number, ability and experience; the evidence of which is seen in the widely-extended favor which our house has always enjoyed before the public.

The fires in the Wisconsin woods destroyed \$150,000 worth of property in the northern counties of that State. Several villages were burned.