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Heavy Fly Wheels and Grist Mills.

While some correspondents have written to us stating that heavy fly wheels were positively necessary to prevent backlash and to produce equable motion in flouring mills, Messrs. Hatfield & Smith, of Cuyahoga Falls, Ohio, inform us by letter, that after several years' experience, they have formed the opinion that "a heavy fly wheel is but a poor remedy for a badly constructed steam engine." They assert that if a steam engine is properly proportioned, with the valve arranged for the work it has to perform, it will run well with a light fly wheel. The performances of the mill engine described on page 208 (whereby ten bushels of wheat were ground to each bushel of fuel consumed), they consider good. They (H. & S.) have put up an engine of 12-inch bore cylinder, 24-inch stroke, boiler 26 feet long, 42 inches in diameter, with two 16-inch flues, set in brick arch, which turns out sixty barrels of flour in twelve hours running, using thirty bushels of slack or dross coal, which only costs one dollar per tun in that place. This mill belongs to Mr. Thayer, of Akron, Ohio. If we allow four bushels of wheat for each barrel of flour made, no less than eight bushels of wheat are ground to each bushel of slack consumed. This is doing good work certainly. They have also put up quite a number of engines of the same character for other parties, both for grinding grain and sawing wood, in which coal, wood and sawdust are employed for fuel, and with the same satisfaction as to results. They gear their engines for the piston to travel at the rate of five hundred feet per minute; cut off steam at half stroke, and use a single slide valve.

A Good Sign.

The editor of *Hall's Journal of Health*, an excellent monthly, published in this city, says:—

"In passing through the city, or entering houses for the first time, we find ourselves deciding upon the character of the inmates from the newspapers we see at the door, and the periodicals lying about; and we feel a guarantee that there is refinement and elevation within when we see the *Home Journal*, SCIENTIFIC AMERICAN, *Musical World*, *Littell's Living Age*, and publications of that stamp. These four might be profitably taken by every family in New York, and ought to be taken in thousands where they are not; for they are always chaste, always instructive; nothing in them to blunt the moral sense, or offend our religious sentiment. In these, and some one good religious newspaper, there is as much reading of this sort as the generality of our households can profitably indulge in."

THE next meeting of the American Association for the Advancement of Science will be held at Baltimore, Md., on the last Wednesday of this month (April).

JAY'S MORTISING AND BORING MACHINE.

Fig. 1

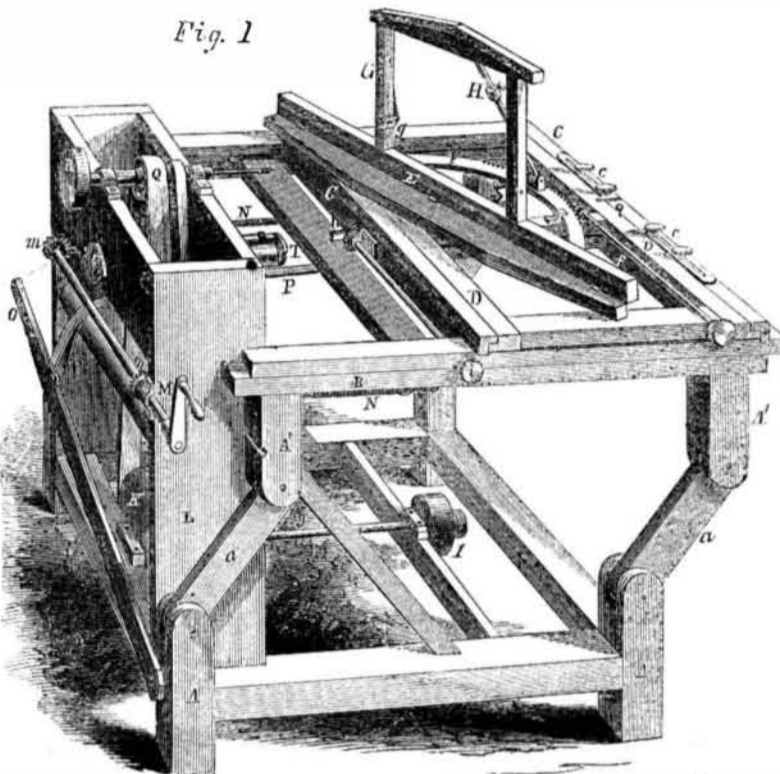


Fig. 2



Fig. 6



Fig. 3

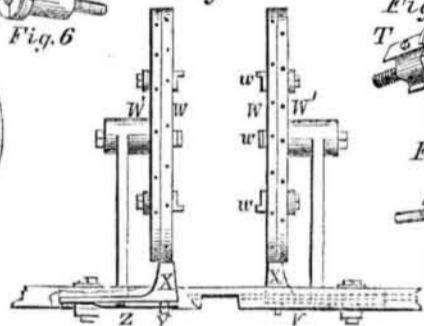


Fig. 5



Fig. 4



The number of machines which will perform many operations, and combine within the limits of a compact frame, appliances which render them useful for a multitude of purposes, are daily becoming more numerous. Amongst the most prominent of these is the machine we are about to describe, which is the invention of J. M. Jay, of Canton, Ohio, and was patented by him July 28, 1857.

Of our engravings we will describe first the perspective view, Fig. 1. A are four legs bound together in a frame, and having hinged to them links, a, which are again hinged to the legs, A', of a supplemental frame. To B are secured cross slides, C, one of them having two small sliding stops, c, upon it. In these slides there moves the frame, D, carrying a frame, E, provided with a cogged arc, F, so that it can be set at any angle by the rod and worm wheel, f. G is an upright stand for holding stuff, and being provided with two spring-fastened angular catches, g, and so arranged that it can be placed at any angle by means of the sliding bar and screw, H. There is a small stop screw which regulates the depth of the mortise, seen at h, and operated by the milled head, i. The frame, B, can slide to and from the tool on A', and it is generally held back by two spiral springs, not shown in the engraving.

I is a band wheel on a shaft, J, that receives

the power, and gives motion to K placed in a vertical frame, L; this frame, L, also carrying a shaft, M, that has two bevel wheels, m, upon it, by turning which, the screws, N, are rotated, and the frame, A', raised or lowered to the tool. O is a lever, having a band, P, attached to it, the other end of which is connected with the back of B, so that by depressing O, the frame and contained stuff is brought against the tool. Q is a band, which passes over one tool arbor that has a wheel, R, on one end, so that the machine can be driven by hand, and a tool, S, in a recess in its other end. The belt, Q, communicates with K, and derives its motion from it. T is a tool in an arbor below, that is operated by Q and also rotated by it. This lower arbor is placed in a sliding frame, U, so that it can be lifted up or down, and adjusted in the most desirable position. The stuff to be mortised is placed on the frame, E, at any desired angle, and by means of a pin in D, catching against the stops, c, the length of the mortise is determined. The two notched plates, g, are used in boring round stuff, and in fastening a chair pillar, when you wish to mortise one; the extra arbor cuts tenons of any thickness, by simply raising or lowering it.

Fig. 6 is a hollow auger for cutting round tenons. Fig. 4 is a tool for turning chair backs, and Fig. 5 smoothens or cuts any stuff.

There is an almost endless variety to the tools that can be employed in this machine, for the various purposes to which it can be applied. For the purpose of turning carriage hubs, the frame, D, has to be removed, and the face plates, W, (of which Fig. 2 is a front, and Fig. 3 a side view,) on the pieces, V, put in its place. These face plates are each composed of two pieces, W and W'; W having three slots, direct from the center to the edge, and straight, and W' having spiral slots, from the center to the edge; in these slots work slides or catches, w, so that by turning W' they will firmly grasp the hub, and a spring catch, X, fitting into the holes on the rim of the face plates, holds it secure while being shaped. Z is the spring of one of these catches, part of V being broken away.

This is a most convenient and compact machine. Any more information concerning it can be obtained by addressing the inventor as above.

Steam Squirrel Hunting.

A correspondent writing from Stockton, Cal., informs us that ground squirrels are so numerous in that region that they are a perfect pest to the farmers, as they destroy a very large portion of their crops. As much as \$100,000 are expended annually in California in purchasing strychnine, arsenic, and phosphorus, to destroy them, but these poisons seem to produce no useful result in diminishing their numbers. Our correspondent, however, has, we think, hit upon a plan, which, when he carries it out, will put them to route most effectually. He proposes to get a steam boiler of about four-horse power, mount it on a wagon, draw it out to the fields, get up steam, and conduct it into their holes by a pipe, and thus steam the "varmints" in their dens. These squirrels live in what are called "towns;" their holes are very numerous, and in clusters, and the passages underneath are all connected. By taking the steam pipe, therefore, and inserting it in a hole, then closing all the others in the vicinity, and letting on the steam, a whole community will thus be steamed at one operation. When this is accomplished, he will proceed to the next township, and extinguish its subterranean inhabitants in the same manner, and so on until the whole of squirreldom in that region is subdued by the all-conquering power of steam.

Discovery in Electricity.

Dr. C. G. Page, of Washington, D. C., has discovered that positive electricity will extinguish the flame of a lamp, and negative electricity will increase it. When the flame of about two inches high is charged positively, from a powerful machine, it is rapidly shortened to total extinction. When the flame is charged negatively, it is immediately enlarged, a portion of it being impelled down around the wick tube for the distance of an inch, and a portion also elongated above. This discovery, it is thought, may serve to throw some light upon the many unsolved caprices of lightning.

[The above is taken from the *New York Evening Post*, but we have also seen it in several other papers. Supposing the discovery to be true, we would really like to know what light it can throw upon "the many unsolved caprices of lightning."—Eds.]

The blasting necessary to obtain material for the construction of the harbor of refuge at Holyhead, North Wales, still continues; and on one occasion 200,000 tons of rock were blasted at once by 21,500 lbs. of gunpowder.