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## IMPROVED DIAMOND STONE SAW.

It is only necessary to recall the fact, that of all the trades, that of the stone cutter was practically the most lacking in labor-saving inventions, to appreciate the vast progress accomplished therein by the utilization of the diamond as a cutting tool. Days of slow grinding by the sand saw are giving place literally to minutes of swift penetration by the diamond blade. Numerous ingenious applications of the carbon to industrial uses have already appeared in these columns, and it is presumed that the reader is tolerably familiar with the effect of the diamond tool upon materials far more refractory than the metals. In proceeding to examine, therefore, another machine based upon a similar utilization, the questions of adaptation of the diamond to its work, so as to secure the best results, and that of the construction of apparatus to conduce to such an end, are the matters which present themselves most prominently to our investigation. So far as certain points of construction are concerned, to which reference will be made as we proceed, the invention we are about to describe is new; with regard to its essential features, however, the test of experience has been applied, and successful operation over some two years has well demonstrated their efficiency. The machine is a single blade stone saw. Its uses are to divide blocks into slabs, bed ashlar, edge coping, sills, and the like, square up blocks, and all but finish moldings, accomplishing all this with a remarkable rapidity of execution. Its essential feature is that the diamonds are made to act upon the stone in such a manner as to receive pressure or blow in one direction only. Without this provision, it is found by experience that no amount of ingenuity or care in the setting of the diamonds can prevent their being displaced from the sockets by the alternate reverse action of the blade.

It is first necessary to glance at the mode of securing the carbons in the teeth, as the square bits of steel which are inserted in recesses in the blade, and there held by soft rivets,

may be termed. At proper points along the lower edge of the teeth, indentations are made to receive the diamonds; these, inserted, are firmly bound in place with wire, and while thus temporarily secured are brazed-in in the usual way, the wire being afterwards removed. This operation, we are assured, fastens the borts or carbons in with certainty, so that no trouble is experienced through their working loose and falling out, so long as the saw is caused to cut, as above noted, in but one direction.

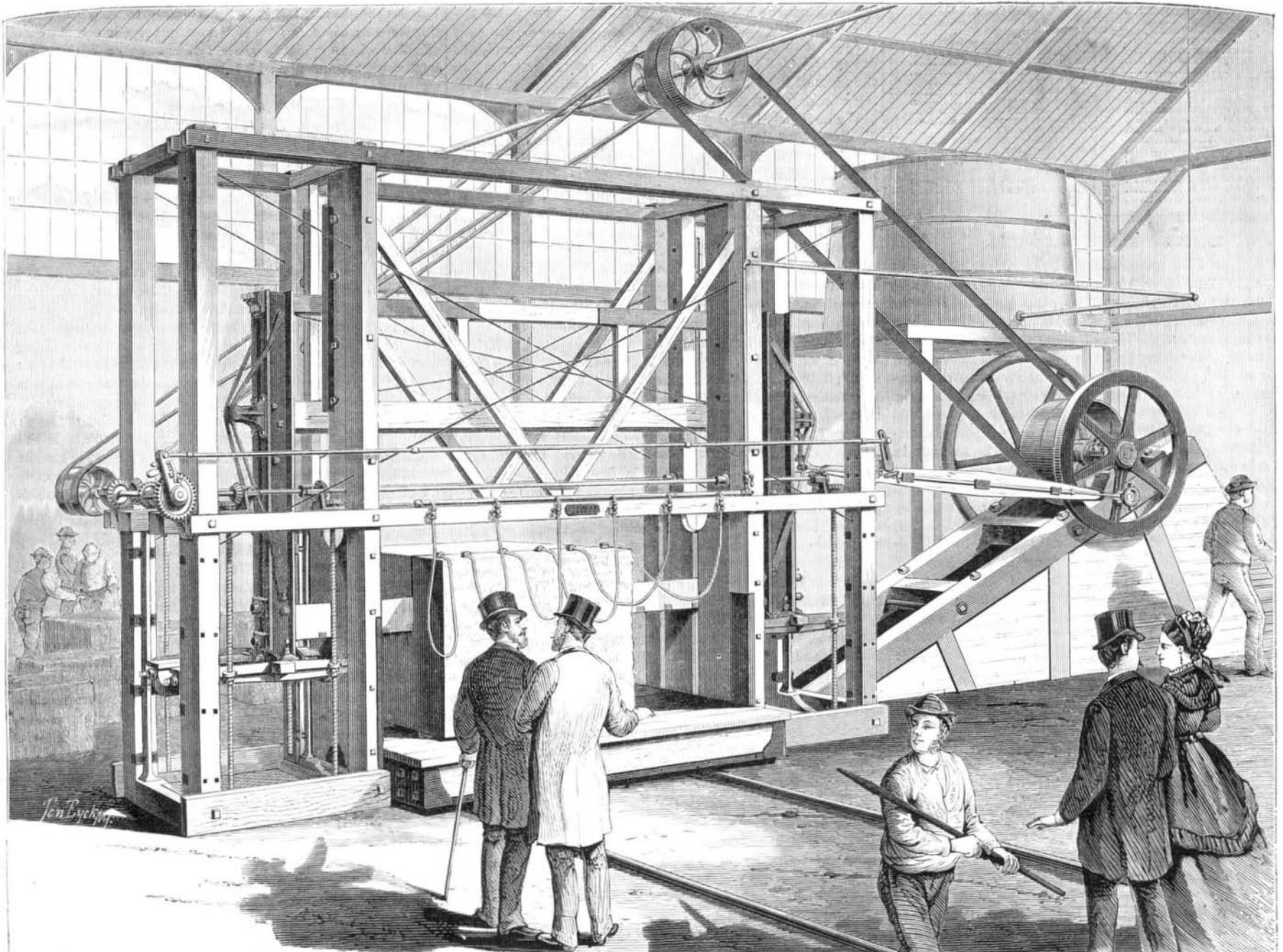
In the machine represented in the annexed engraving, there is a timber frame formed of eight posts, planted in a concrete foundation and strengthened with the necessary horizontal and transverse bracing. The sash frame is carried by horizontal slides between the posts, and supported on the nuts of eight screws, all of which screws are connected together by gearing to which motion is given by a separate pulley and belt. The effect of turning the screws in one direction is to lower the horizontal slides, and so feed the saw down to its work, the reverse action of course producing the opposite result. The gearing may all be moved, by hand or by belt, when it is desired to adjust the blade vertically; but when the mechanism is feeding, its operation is automatic through suitable arrangements whereby it is moved with the proper degree of rapidity. The horizontal slides above referred to are provided for the sash frame to travel upon; the blade, being mounted in the latter and tightly held by buckles, receives its reciprocating motion from the pitman connecting the crank with the sash.

We have stated that the blade cuts in one direction only. This important point is gained through depressing the saw when it begins its forward motion and then raising it on the return stroke. The mechanism for this purpose is extremely simple, and consists of an eccentric on the crank pin of the pitman, which, through a connecting rod extending along the latter, actuates certain levers and cams, the effect of which is to push the saw down against its own natural spring at the

beginning of the stroke, and so to hold it at a given point of depression until the end. The resilience of the metal, of course, when the pressure is removed, carries the blade back to its normal position, and so lifts it clear of the bottom of the kerf, during the return stroke.

The above, though general as regards detail, is sufficient for the comprehension of the device, to the performances of which attention may next be directed. From those using the machines, we gather the following statement of its average downward feed per hour in various kinds of stone, the figures presented having, in many instances, been borne out by trials under our own examination: Connecticut brown stone, from 2 to 3 feet; Dorchester, N. B., stone, 2 feet 6 inches to 3 feet 6 inches; Amherst, O., 3 feet 6 inches to 4 feet 6 inches; Lockport limestone, 14 to 18 inches; Marblehead, O., limestone, 2 to 3 feet; Canaan, Conn., Westchester, N. Y., or Lee, Mass., marbles, 12 to 16 inches. In the harder kinds of slate, with quartz veins, the saw cuts from 2 feet 6 inches to 4 feet per hour, and so on in proportion to the hardness and impenetrability of the rock. Red Scotch granite we have seen cut at the rate of 3 inches per hour. The kerf made is from  $\frac{5}{8}$  to  $\frac{3}{4}$  of an inch, leaving a perfectly smooth surface. Slabs to almost any desired degree of thinness may be sawn. The work generally, it is claimed, is accomplished at a speed from ten to thirty times faster than the best apparatus hitherto employed. It is also asserted, by those using the saws, that the cost for the diamonds and setting is less than for the sand and iron required to do the same quantity of work by the old method. The machine is coming largely into use in this city and vicinity, and meeting, wherever employed, with the highest commendation.

Messrs. H. and J. S. Young were awarded, for it, the highest premium of the American Institute two years ago, and its progress and history since certainly show the propriety of that acknowledgment. Mr. Hugh Young, 546 East 117th street, New York, is the proprietor and manufacturer.



YOUNG'S DIAMOND STONE SAWING MACHINE