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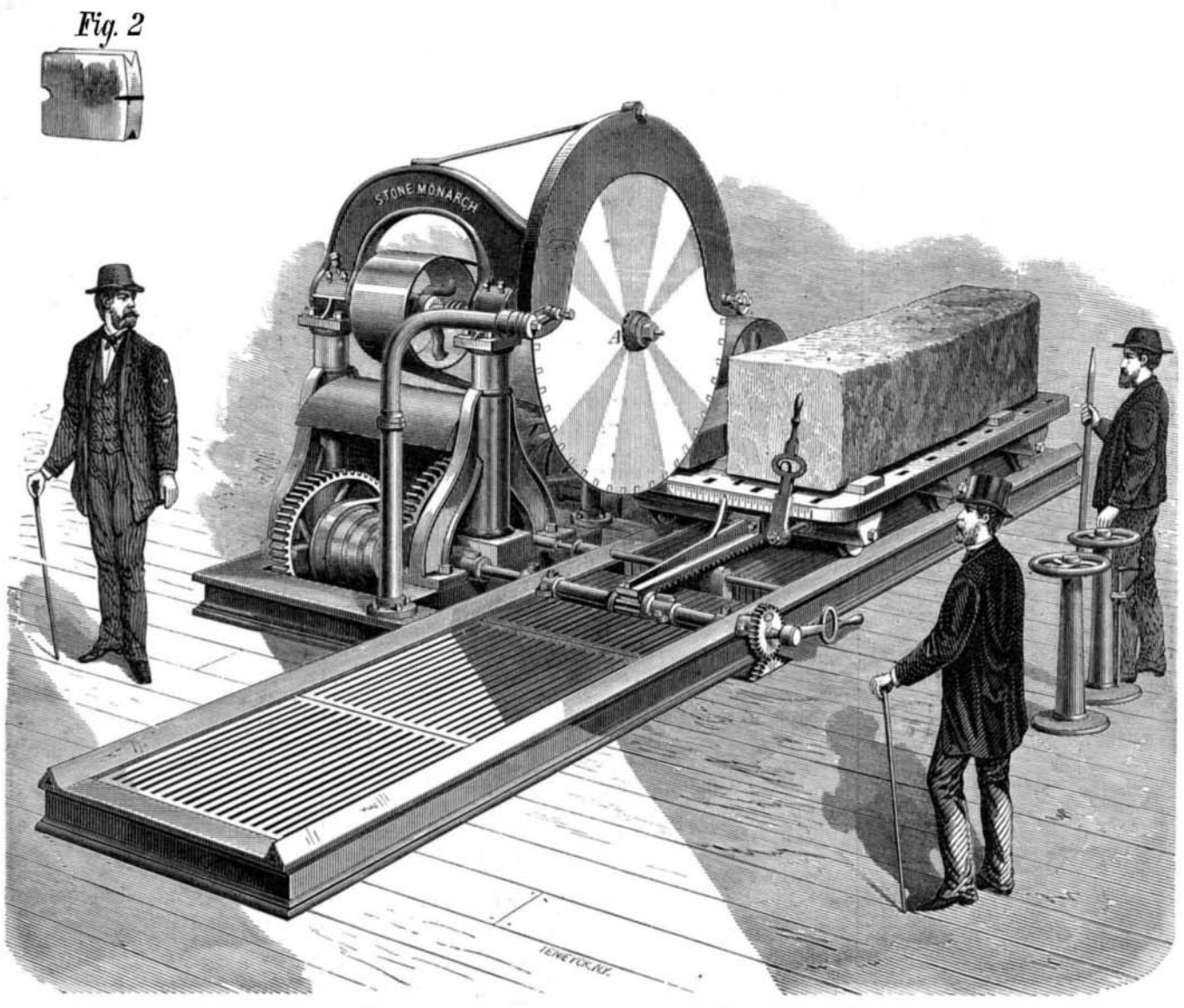
IMPROVED STONE-SAWING MACHINERY.

Since the discovery of the bort carbon, or black diamond, much skill and a vast amount of energy and capital have been expended to render it of practical value to manufacturing industries. It has long been known to scientists as one of the hardest substances in Nature; and it has been, and is still, used by lapidaries in cutting and polishing other precious stones, even the white diamond. It has also given aid to industrial science in improving the diamond drill, and more recently to the mechanic arts, in giving us new cutting tools for use on substances on which iron and steel were useless. But while its value for cutting hard substances, especially stones of various texture and density, has been known and appreciated, its practical utility has been impaired by a difficulty in harnessing it, that is, holding it securely for effective use. A large amount of inventive skill, time, and money has been expended in the attempt to accomplish this, with more or less success; but the attempts were generally entire failures, especially the attempts to saw and work stone The records of the Patent Office, within the last ten years, show the various modes and appliances to this end; and the invention of Mr. Branch has been one of the most practical successes among all such machines

Fig. 2



BRANCH'S DIAMOND STONE-SAWING MACHINE

The circular saw, taking into consideration its unlimited capacity in sawing lumber, was considered by most inventors as the one to which the diamond could best be applied for sawing stone. Mr. Branch's first patent, dated June 8, 1869, was for the insertion of the diamond into a steel or iron holder made in two parts, with recesses for the diamond, and provided with soft metal cushions for the diamond to rest in. These holders were then dovetailed into the edge of the saw disk, and compressed, by a wedging device, the diamond into the soft metal. This saw was a success so far as the cutting was concerned, but the diamond could not be held securely for practical work, and the project was abandoned. Others have attempted improvements on this by brazing the diamonds into iron or steel holders; but the results were no better. The soft metal cushions would yield to the pressure of the work, and the centrifugal velocity of the saw would throw the diamond away. Some inventors, seeing these apparently unconquerable difficulties, regarded the circular saw as impracticable; and attempts were made to apply the diamond teeth to the sash or reciprocating saw, claiming for it greater capacity in the sawing of large blocks. While this merit may be conceded to a limited extent, the reciprocating saw is not equal to the circular saw, either in quantity or quality of work performed; while the risk of losing the diamond was in no wise lessened, except by the use of a sieve or cage to catch the recreant diamond, so that it might be again reset, to be again, as before, thrown out.

Mr. J. W. Branch, the inventor of the machine herewith illustrated, claims to have achieved the secure holding of the diamond in steel or iron holders, without the dubious aid of soft metals, and his Stone Monarch, as he calls this sawing machine, gives the circular saw the same prominence in relation to the stone-working industry as in that of wood-working.

The peculiar manner of inserting the diamond into holders, and these holders into the saw disks, is fully described in letters patent dated August 31, 1875; and the chief merit of this invention is the perfect security given to the diamond under any velocity whatever. The diamond holders are simple in construction (Fig. 2), and are furnished either in the saws completed, or in duplicate, so that any that may become faulty, by undue pressure or otherwise, may be renewed or replaced. They can be inserted into the saw by any practical mechanic, if the saw in other respects be perfect, without his having the skill to set the diamond.

The mode of applying water for lubricating the saws in work, and washing away the grit and dirt, is novel, and is peculiar to these machines. The water is conducted through the center of the mandrel into chambers, and through radial orifices, A, in the saw collars on each side of the saw, causing the water to impinge upon the saw blade, and to be, by the centrifugal force, conducted to the cut. This effects three results: 1. Keeping the journals of the mandrel cool. 2. Keeping the saw cool and even in temperature, preventing all undue expansion. 3. Cleansing the saw from all grit and dirt produced in sawing.

The machinery for conveying the stone is perfectly under the control of the attendant, and is provided with a simple feeding device, adjustable to accommodate the variable texture or density of the stone to be sawn. The saws are also made adjustable relatively to the depth of cut, either entirely or partially through the block, preserving a straight line at the bottom of the cut, but allowing for moldings, rebates, etc.

The table to carry the stone is placed on a series of rollers set in the carriage, which provides for the easy adjustment of the stone at right angles with the saw, so as to cut off any thickness required. The carriages upon which the table is placed is also provided with rollers, fitted upon parallel V ways, and with a feed rack working upon a feed pinion.

It will be observed that there are no slides, and that the roller bearings and journals are all covered, so that the working parts are not impaired by any accumulation of grit or dirt. The saws are used either over or under the work, but preferably over for sawing large blocks and ashlar, and under for edging, crosscutting, and sawing small dimension stone. This range of use is due to the central application of water; as, by the centrifugal velocity of the saw, the water is always conveyed to the cut. In short, these machines are adapted to meet all the requirements of straight line work, without complication; and a large proportion of work required for building can be finished, ready for erection, without the aid of the rubber or hand labor. The saws, moreover, run at the periphery at an average velocity of 10,000 feet per minute, which effects great rapidity and perfection in cutting stone: the difference being due to the variable density of the stone to be cut, varying from 1 to 36 inches per minute, or per 10,000 feet run of the saw. The ordinary freestones and sandstones are sawn by these machines at the rate of from 6 to 36 inches per minute, and marble and limestones at from 3 to 18 inches per minute, or an average from 200 to 800 feet per day, making due allowance for handling of stone.

The manufacturers, Messrs. Branch, Crookes & Co., have on exhibition at the Centennial (section A 16 and 17, saw mill), two of their diamond circular saw stone machines, with the necessary traveling crane and facilities for handling stone. The two machines have 66 and 20 inch saws respectively. The 66 inch saw contains 84 diamonds, and the 20 inch saw 60 diamonds. These machines are kept in operation, practically illustrating what we have already described; and they attract a great deal of attention from visitors to the Exhibition.

Patented to Joseph W. Branch, under dates June 8, 1869, May 27, 1873, and August 31, 1875. For further particulars and for descriptive circulars, address Branch, Crookes & Co., 114 and 116 Vine street, St. Louis, Mo.

Melon Sugar.

Andros Island, in the long delta between the rivers Sacramento and San Joaquin, California, belongs to a group of low islands that are submerged at high water, and therefore not fit for culture. But when reclaimed by embankments they are exceptionally productive Melons are a crop that never fails in this climate, and the factory on Andros Island can get melon juice from a vast area of melon country at small expense for transport. Water melons with white pulp are preferred. They are planted twelve feet apart one way, and the other way six feet apart. The leaves of the plants cover the ground and kill the weeds before they interfere. Besides, they make an impenetrable mulching, which keeps the soil moist and prevents baking. The melon juice is free from impurities, which make chemistry costly in beet sugar, is much less expensive, and the sirup is delicious. The seeds make oil, and the refuse is good for cattle. Taking account of so many advantages, sugar from melons, though rated at 7 per cent of the weight of the fruit, instead of 8 per cent allowed for beets, costs less to make. The difference may be set down as 5½ cents for melon sugar to 7 cents a pound for beet sugar. In regard to quality, melon sugar is superior. Unless extra care be used, beet sugar is apt to have an unpleasant buggy flavor.

Let it be understood that beets can only succeed in moist, bottom lands. Melons strike deep root, and they grow everywhere on our uplands. No doubt they would thrive luxuriantly in Jersey, Delaware, and Maryland. In the sandy soil of States South, no crop can be more certain, and Baltimore would make a convenient center for supplies of melon sugar works. Our California correspondent states that San Francisco sympathises with Baltimore, and will keep her advised as to the success of the melon sugar-making industry.—*Baltimore Sun.*