



Information about Milling.

We have received a very great number of letters upon this subject, many of which have been published, and a still larger number have not—some because of their obscurity, others because of their similarity in ideas to those which have been published. The following is one which evinces considerable practical and general knowledge of the subject:—

MESSEURS. EDITORS:—The information drawn out in the SCIENTIFIC AMERICAN by the inquiries of "A Young Miller" has been read by me with more than usual attention. The town in which my apprenticeship to the milling business was commenced has four mills, in which are thirteen runs of stone in all, each mill having one run with bolt connected, for the same purpose that "A Young Miller" intimates his is used; and one of them has a run with cooler, bolts, conveyors, &c., for merchant work. The other eight runs—two in each mill—are used for other grinding. I have been employed, more or less, in all of these mills, and for several years in one of the best grist mills in the county, and for a few weeks in one of the best flouring mills in the State, and have also made stone-dressing in Maine, New Hampshire and Vermont my special business for three years. If "A Young Miller" has by this time a good dress on his millstone, he must be a happy man. He has had a variety of dresses recommended, one at least of which I would work off a millstone as soon as possible, for reasons urged by some of your correspondents in their objections to circle dresses. In some sections of country that I have passed through, the circle dress is preferred, even after trial of the straight dress; and one of the best flouring mills within my knowledge (having five runs of burrs) uses a circle dress. Oliver Evans, the father of American millers, in his work entitled "The Young Millwright's and Miller's Guide," discusses the comparative merits of circular and straight dresses, and his diagrams and explanations favor the circle dress. In "The American Miller and Millwright's Assistant" (referred to by one of your correspondents) Mr. Hughes devotes a few pages to the subject, and shows even less disparity between straight and circle dresses than I believe really exists among the great variety of straight-furrowed, commonly called quarter dresses. "Old Miller" objects to circle dresses, and asserts "the greater the circle the warmer the meal." It seems to me this favors the circle, and the smaller the better, as one might be so large that a few feet of its circumference would vary but little from a straight line. My experience in putting in circle dresses has modified former prejudice against them very much, and my experience with straight dresses has led me to reject what some of your correspondents recommend. Making the draught circle with a radius equal to one-sixth of the radius of the stone, I find no fault with, except the incorrect way of stating the question, viz.: "one inch to the foot." Some of your correspondents remark particularly about cutting down the furrows square on the back, but they give no reasons for doing so. Is it not a fact that when they are cut so, and made large at the skirt, they are generally more or less filled with meal and sometimes with dough? There is no use, then, in cutting away the stone to be replaced with meal.

"A Young Miller" gave us the size, quality and velocity of his millstone, but said nothing about the amount of power at his command. Is it unnecessary that the power should be taken into consideration in dressing a millstone? Only one of your correspondents mentions anything about power, and that only in reference to the amount ground, whilst others suggested that the stone should run faster, increasing its speed by 66 per cent. beyond its present velocity, thus augmenting its grinding capacity to twenty bushels an hour. The following are important considerations for millers and millwrights:—Would a change of gearing produce the result, or must a new wheel or other power be furnished? One suggested that "A Young Miller's" bolt reel should be increased in diameter by 33 per cent. more than its

present size, but no one has said a word about its movement. Does it make any difference whether a thirty-inch reel makes forty revolutions in a minute or a forty-inch reel makes thirty revolutions per minute? If the centrifugal force increases with the square of the distance, is not a large reel more liable than a small one to carry the meal around without sifting it, even if the cloth moves with a given velocity? Does not the condition of the millstones, and consequent condition of the meal, have much to do in determining the amount and quality of work performed by a bolt of any description? May not this account in part for the great difference in the opinions of your correspondents in relation to the working capacity of "A Young Miller's" bolt? Is it not equally as important to agricultural communities that grist mills should be kept in the best possible condition, as it is to proprietors of flouring mills that they should be kept so? Is there not great need of, as well as great chance for improvement in that class of mills, all about the country, where small quantities of grain are ground for individuals? O. A. J.

Causes of the Whirlpool.

MESSEURS. EDITORS:—Having inquired through your columns, some weeks since, as to the cause of whirlpools, and noticed the statements of two of your readers, I will venture an explanation. The immediate cause is the meeting of opposing currents. If at the point of contact the currents pass each other, friction between them will cause a whirl. To illustrate:—Two boys run toward each other, if they pass and catch hold of hands they will be set into a whirl. If the force which impelled them increased, the whirl would increase until the centrifugal force would part their hands. In the experiment of a vessel with a hole in the bottom, the whirl is caused by the lateral currents running along the surface to the discharging tube; the slightest irregularity in the surface, or any other cause which can vary the direction of the currents, may determine the direction of the whirl. If a given vessel be filled and discharged a number of times, the whirl will not always be in the same direction. Sometimes the water will discharge without a whirl, showing that the lateral currents meet at the opening, without passing each other. Whirlpools may be seen in rivers wherever there are passing currents, or where there are obstructions at the bottom. They revolve in either direction with equal facility. Mr. Morley, in No. 3, Vol. VIII, of the SCIENTIFIC AMERICAN, says "The whirlpool is caused by the diurnal rotation of the earth. . . . The direction of the whirlpool in the northern hemisphere will be against the hands of a watch, and the opposite in the southern." He refers to an east and west current to prove his hypothesis. Now, east and west currents do not always exist in whirlpools. Where a river runs south and a shore current runs north, whirlpools will be formed at the point of contact between the two currents. That they are caused by the rotation of the earth is certainly incorrect; or that the motion of the earth determines the direction of the whirl is equally so, for water is in all conditions upon the surface of the earth subject to more powerful influences that slightly vary the direction of its currents, than can be supposed to result from the cause alleged. R. F. STEVENS.

105 East Forty-ninth street, New York City.

A Grateful Inventor.

MESSEURS. MUNN & Co.:—The patent for an improvement on my "Hoosier Grain Drill and Seed Sower," has been duly received. I thank you for the prompt and efficient manner in which you have so ingeniously set forth my claims and engineered my case through the Patent Office. The perspective view given by you in the drawing is very much better than I expected it could be executed; I feel constrained to express to you my thanks as well as admiration for the perfection of the work, and to advise all persons having business to transact with the Patent Office, or desiring to have drawings of machinery executed, by all means to go to MUNN & Co. I am satisfied that I have the best Grain Drill in the world! You may perhaps think this boasting, but my experience in Drills—after a full and careful examination of the defects of nearly all now in use—justifies the assumption. JOSEPH INGELS.

Milton, Ind., Jan. 22, 1863.

Completion of the Duomo at Florence.

The Italian Government, desiring to mark its sympathy with modern progress in the arts, and in the hope of completing one of the most famous architectural monuments in the country, has invited architects to send in by the beginning of the year (1863) designs for the completion of the west front of the Duomo at Florence. This invitation has not been confined to Italians living at home or in foreign countries, but the competition, which embraces three grades of premiums, has been thrown open to the world, and several distinguished French architects are understood to be about to compete. Amongst the Englishmen are, we believe, Mr. Pappworth and Mr. Burges, the last the successful competitor for the Memorial Church at Constantinople, and, with Mr. Clutton, for the Cathedral at Lille. Mr. Burges is also known as the successful restorer of Waltham Abbey. The restoration of the Duomo at Florence, or rather the finishing of its west end, has been an architectural problem for several centuries. Arnolfo de Lapo began it in 1294, and before his death in 1300, probably carried it as far as the springing of the vaults. The nave and smaller domes of the choir may have been built in the next twenty years. Arnolfo, after the fashion of the Mediaeval architects, left no drawings to show how the work was to be completed. Brunelleschi took the work in hand and covered its magnificent "crossing" with the present enormous dome, an octagon. Mr. Fergusson suggests that Arnolfo intended to use an octagonal dome-tower, diminishing in stages and surmounted by a spire, the whole to be about 500 feet high, after the general fashion of Chiaravalle, near Milan, a contemporary work. The proper method of completing the west front is open to much discussion, and will doubtless engage the attention of many architects.—*Athenaeum*.

The Glut of Silver in Canada.

It is some gratification in these days of paper currency to know that there is coin still somewhere on the continent. If we have no specie the Canadians are surfeited with it, and are consequently in just about as bad a fix as we are. The following paragraph tells the whole story:—

"It would do a hard-money man good to go to Canada. The currency consists almost exclusively of American silver. Silver abounds everywhere. Everybody is loaded with it, and everybody tries to get rid of it, as people do of doubtful funds. The taxes are paid in silver, and the collectors take it by the bushel. The City Treasurer of Toronto has half a tun of it. The merchants have bags of it in their safes. The banks won't receive it. The Great Western Railway has issued printed notices that only five per cent of silver will be received for fare or freight. Only think of a country where you cannot pay your fare on the cars in silver coin! At Toronto, London and elsewhere, business men and firms have united in a general resolution to receive silver only at a discount of five per cent for Canada bank paper. This of course applies to American silver, as the Canadian and English coinage is a legal tender. Think again of a region, within one mile of Detroit, in which the 'dirty rags' issued by the bank are worth five cents on the dollar more than the shining coin!"—*Detroit Advertiser*.

Steam Superheaters.

It is well-known that considerable benefit is obtained from superheating steam passing from the boiler to the cylinder of a steam engine, but the iron tubes of a superheater are very liable to corrode. This evil has caused many parties who had adopted iron tube superheaters to abandon their use for copper tubes. A correspondent (F. H. Wenham) of the London *Engineer* states that he has used a superheater provided with iron tubes for eighteen months, and the plates and tubes, which are very thin, are as perfect as when they were put in. He states that this result has been effected by allowing some grease to pass through the superheater. It has formed a varnish coating on the surface of the metal which protects it from oxidation. He states that if a pipe is fitted to the superheater to admit some oil, grease or tar occasionally at the point where the steam enters, the metal will be protected and the iron superheater be rendered as durable as one having copper tubes.

Chocolate Corn.

In Illinois a species of millet is grown under this name, which serves as a substitute for coffee, and tastes precisely like weak chocolate, and even resembles it in color. The preparation of a beverage from it is thus described:—"If we want for our table four pints of chocolate, we take one and a half head of grain, nearly filling the funnel of our coffee-mill, which is about $4\frac{1}{4}$ inches wide, and $1\frac{1}{2}$ inches high, and grind the kernels a little fine. Having proceeded thus far, we mix the ground substance with two pints of water, and boil it until the starch contained in it forms into a lump; the liquid is then passed, to separate it from the grains, through a fine wire sieve or tin colander; two pints of sweet milk, from which the cream has been skimmed, and a good table-spoonful of common powdered sugar, and a little cinnamon, are then added to the decoction. It is now boiled once more, and a most delicious beverage, which is scarcely distinguishable from light chocolate, is ready for use. If you wish to improve it still further, you may add an egg and a little nutmeg."—*Exchange*.

We have long been stigmatized as a nation of dyspeptics, and we think the reason why we are so is given very fully above. When people put such slops and messes as "chocolate corn" into their stomachs, they ought not to be surprised if "their general health is not very good." Pork and "pie" have a great deal to answer for in this country, and we wish most heartily that the old Jewish law regarding the usage of the former could be observed by our people. Few persons have digestive organs of sufficient strength to master this meat, and whether we eat it boiled, roasted or fried, or more indigestible still, in the shape of sausage meat, it is almost certain to rebel against us. It is but seldom that we ever use this food in our family, but we had the curiosity the other day to ascertain how much fat or grease was contained in two big doggy-looking sausages, weighing, perhaps, half a pound. The result was that over two table-spoonfuls of clear lard was extracted from those two sausages alone. We have frequently seen men, and women too, eating this sort of diet, and have heard them complain that "it did not set very well;" we should think not. A table-spoonful of lard between the sensitive coats of the stomach is not apt to induce the most delightful sensations, and those persons who persist in using pork in any shape, would find themselves much better off without it. Down with the sausage! Let us have no more of it; it has created enough distress already, and we hope that it will disappear from our tables entirely. We are borne out in our dislike of pork by medical testimony of a high character. Repeatedly have physicians declared that it was unwholesome and so on; but still the people cannot relinquish the forbidden food. We are "down" on pie, too; not, however, in so great a degree as we condemn pork. Pies, made in the proper manner, are not necessarily unwholesome, but in the hands of ordinary cooks they are tremendous weapons of offense. The unwholesomeness of pies arises mainly from the quantity of butter (shortening) employed in the pastry. Fruit baked between two crusts is not unhealthy, but the crust itself is, and lies heavily on the stomach. The butter turns sour, gives flatulence, and creates distress generally in persons of ordinary digestive force. In the country everybody eats pie; at morning, noon and night there is a deluge of pie which old and young eagerly attack. The little children cry for it, the old ones demand it; and we heard with horror, on one occasion, a woman relate that she had just baked 17 pies for the week. "How many are there in your family?" we asked. "Two," she said. Comment is superfluous. Here are two people who eat 17 pies in a week, quite as a matter of course. They were always sighing and complaining; the husband was downcast and unhappy, and always taking "tonics," and they were at a loss to imagine why life seemed so commonplace and dull. We ventured to suggest that the 17 pies weekly had some responsibility in the matter, but were met with scorn and derision. This is not a solitary case; we might cite many others, and if the reader lives in the country his observation will bear us out in our statement. Pie is a good thing in its way, but it is not a household god, and to live on it mainly is to be dyspeptic and full of all manner of minor troubles. The man who

introduced pie and pork as articles of diet has a great deal to answer for; and consumers of such edibles have usually a heavy doctor's bill to settle annually.

How Turpentine and Tar are Made.

The immense forests in North Carolina, which cover the sandy ridges between the swamps and water-courses, consist almost wholly of the long-leaved pine, the *Pinus palustris* of the Southern States. From them is gathered one of the great staples of North Carolina—the turpentine. These trees at maturity are seventy or eighty feet high, and their trunks eighteen or twenty feet in diameter near the base. They grow close together, very straight, and without branches to two-thirds of their height. Overhead, their interlocking crowns form a continuous shady canopy; while beneath, the ground is covered with a thick, yellow matting of pine straw—clean, dry, level, and unbroken by undergrowth. The privilege of tapping the trees is generally farmed out by the land-owner, at a stated price per thousand, about from twenty to thirty dollars. Under this privilege the laborer commences his operations. During the winter he chops deep notches into the base of the tree, a few inches from the ground, and slanting inward. Above, to the height of two or three feet, the surface is scarified by chipping off the bark and outer wood. From this surface the resinous sap begins to flow about the middle of March, at first very slowly, but more rapidly during the heat of the summer, and slowly again as winter approaches. The liquid turpentine runs into the notches or boxes, as they are technically called, each holding from a quart to half a gallon. This, as it gathers, is dipped out with a wooden spoon, barreled, and carried to market, where it commands the highest price. That which oozes out and hardens upon the scarified surface of the tree is scraped down with an iron instrument into a hod, and is sold at an inferior price. Every year the process of scarifying is carried two or three feet higher up the trunk, until it reaches as high as a man can conveniently reach with his long-handled cutter. When this ceases to yield, the same process is commenced on the opposite side of the trunk. An average annual yield is about twenty-five barrels of turpentine from a thousand trees, and it is estimated that one man will dip ten thousand boxes.

The trees at length die under these repeated operations. They are then felled, split and burned for tar. The dead trees are preferred for this purpose, because when life ceases, the resinous matter concentrates in the interior layers of the wood. In building a tar kiln a small circular mound of earth is first raised, declining from the circumference to the center, where a cavity is formed, communicating by a conduit with a shallow ditch surrounding the mound. Upon this foundation the split sticks are stacked to the height of ten or twelve feet. The stack is then covered with earth as in making charcoal, and the fire applied through an opening in the top. As this continues to burn with a smoldering heat, the wood is charred, and the tar flows into the cavity in the center, and thence by the conduit into vessels sunk to receive it.

About Cotton.

It is calculated that the average weekly consumption of cotton in Great Britain last year was 22,900 bales, as compared with 45,900 bales in 1861, and 48,100 bales in 1860. The average weekly consumption of France last year was 5,200, as compared with 11,000 bales in 1861, and 12,000 bales in 1860. The average weekly consumption of the rest of the continent was reduced last year to 8,300 bales, as compared with 18,100 in 1861 and 18,600 in 1860. An average total is thus arrived at of 36,400 bales per week last year, in Europe, as compared with 75,000 bales per week in 1861 and 78,700 bales per week in 1860. The total receipts of cotton in New York during the month of January last was 21,493 bales. Letters from British Consuls, Bunce and Molyneux, in South Carolina and Georgia, make the Southern crop of cotton last year to be about 700,000 bales of 500 lbs. each. They state that there are now 4,500,000 bales in the secession States. The last arrivals from California bring the intelligence that the cultivation of cotton of a superior quality has been entirely successful in several counties in that State, and in Southern Utah 95,000 lbs. have been baled and

prepared for market. In the Tulare Valley, great preparations are making by the farmers there to cultivate the Peruvian kind. The Legislature of California seems to think highly of the prospect, and has authorized the expenditure of \$12,000 to promote the cultivation.

A Curious Mirror.

Among the curiosities exhibited at the last Paris Exposition, was a huge concave mirror, the instrument of a startling species of optical magic. On standing close to the mirror, and looking into it, it presents nothing but a magnificently monstrous dissection of your own physiognomy. On retiring a little, say a couple of feet, it gives your own face and figure in true proportion, but reversed, the head downwards. Most of the spectators, ignorant of anything else, observe these two effects, and pass on. But retire still farther. Standing at the distance of five or six feet from the mirror, and behold, you see yourself, not a reflection—it does not strike you as a reflection—but your veritable self, standing in the middle part between you and the mirror. The effect is appalling, from the idea it suggests of something supernatural; so startling in fact that men of the strongest nerves will shrink involuntarily at the first view. If you raise your cane to thrust at your other self, you will see it pass clean through the body and appear on the other side, the figure thrusting at you the same instant. The artist who first succeeded in fashioning a mirror of this description brought it to one of the French kings—if we recollect aright it was Louis XV.—placed his Majesty on the right spot, and bade him draw his sword and thrust at the figure he saw. The king did so; but seeing the point of a sword directed at his own breast, threw down his weapon and ran away. The practical joke cost the inventor the king's patronage and favor; his Majesty being afterwards so ashamed of his own cowardice that he could never again look at the mirror or its owner.—*London Engineer*.

Manufacturing Items.

There were 115,766 bales of manilla hemp imported in 1862. It has advanced from $7\frac{1}{2}$ to 9 cents per pound, with an upward tendency during the year.

The Naumkeag Steam Cotton Mill, Salem, Mass., last year, manufactured 2,564,000 yards of cloth. Its profits for the first six months of the year were \$42,411, and it declared a dividend of 5 per cent.; and its profits in the second six months were \$185,253, which, added to surplus on hand, gave a dividend of 66 per cent.; so that the total division of profits for the year was 71 per cent. Its average dividends in twelve years of operation have been $11\frac{1}{2}$ per cent.

The Farmers' Woolen Mill, of Beaver Dam, Wis., owned by G. H. Stewart & Co., manufactured during the past year (1862) 37,000 pounds of wool in cloths, doeskins, cassimeres, flannels and stocking yarn; and sold 15,000 pounds in roves for home spinning, mostly in this country. Over \$20,000 worth of its own manufactures have been sold at the mill in small lots for home consumption. This mill makes only pure woolen goods.

WALL PAPERS IN RELIEF.—The *London Builder* gives the following description of the manufacture of wall paper with the figures in relief. It says:—"The mode in which relief is attained is by the repeated printing of flock upon flock either upon a gold or a plain ground; in the latter case the paper is hung with butt (not overlapping) edges; and, after being well sized, is reduced to one tint by an even coat of oil paint. In both cases the effect is very good. A simple lozenge pattern, about three inches in height, being in uncolored flock on a gold ground, in relief, to the height of about a quarter of an inch, is exceedingly pleasing."

THE NORMANDIE.—The French Admiral has sent home the *Normandie* (iron-plated frigate) in disgrace, as of no use to him.

[We cut the above from an exchange—how true it is we cannot say.—EDS.]

MECHANICS and chemistry are handmaid arts; the one furnishes the instruments, the other supplies the materials.

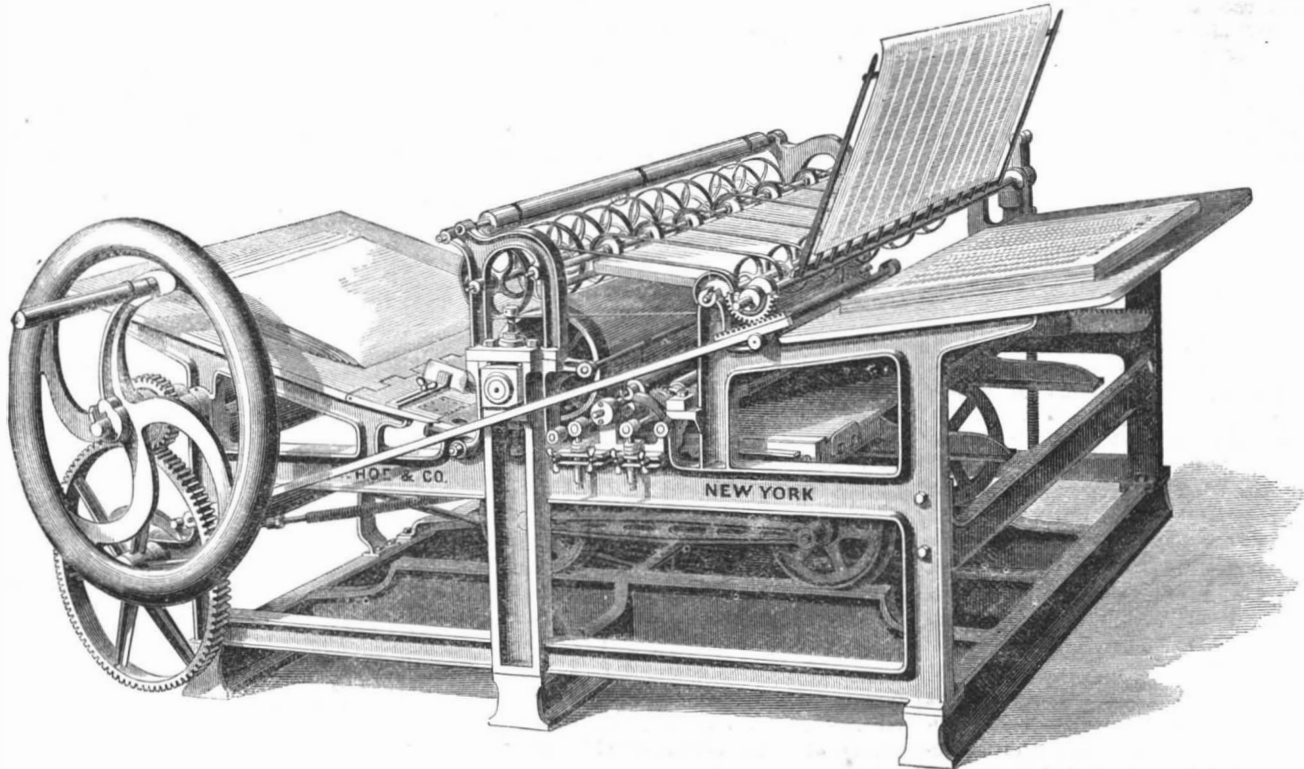
THE *Boston Journal* has lately been printed on paper made from wood at Roger's Ford, Pa.

Improved Printing Press.

The press which we herewith illustrate, and which we have thought important enough to merit a brief notice upon another page, will be found well adapted to the wants of that large class of publishers interested in country newspapers, as well also to all

pressions per hour without difficulty. The press occupies a space 5½ feet by 10 feet and can be worked in a room 7 feet high; those persons who have used them say that they run so easily that no vibration of the building is perceptible. In the last number of the SCIENTIFIC AMERICAN we illustrated an improved

B, secured to it which carries, on a stud fitted to it, the gear-wheel, C. This wheel meshes into the pinion, D, keyed on to the saw arbor running in the box, E. The power is applied at the crank or handle, and by means of the gearing, as will be apparent to all, the saw is revolved. The saw, it will be noticed,

**HOE'S NEW "RAILWAY" PRINTING PRESS.**

others who require a press combining facilities for job and newspaper printing. The mechanical details and operation of the press are here appended.

The bed is carried by a truck having large friction rollers, running on a railway (hence the name of the press), and is driven backwards and forwards by a crank motion, which stops and starts it so gently that the bed springs, usually employed, are not needed. The paper is fed through adjustable guides, to the under side of the impression cylinder, instead of the upper, and the feed-board lifts the sheet up over the guides and against the cylinder as the fingers on the latter clasp it. After an impression is made, the impression cylinder remains stationary while the bed returns; a fresh sheet is then laid on the feed board, and the fingers close on this sheet before the cylinder starts again. As the cylinder wheel gears directly into a rack on the side of the bed, an excellent register is obtained without a pointing apparatus. The bed is provided with iron bearers to equalize the impression on the form. The impression cylinder is never shifted to suit forms of different sizes, but the forward edge of the type is always placed to the same line on the bed, and the fingers and fly-tapes are as easily adjusted as on the ordinary job press made by Hoe & Co. The ink fountain has the adjustable knife, so necessary to job work; a form 27x42 inches, is inked by one roller and a form 22½x42 inches by two rollers. The press has Hoe's self-acting sheet-flyer, and can be run easily and safely at from 700 to 800 impressions per hour. We saw one of the presses in operation, and were told that it was frequently run at from 1,000 to 1,200 im-

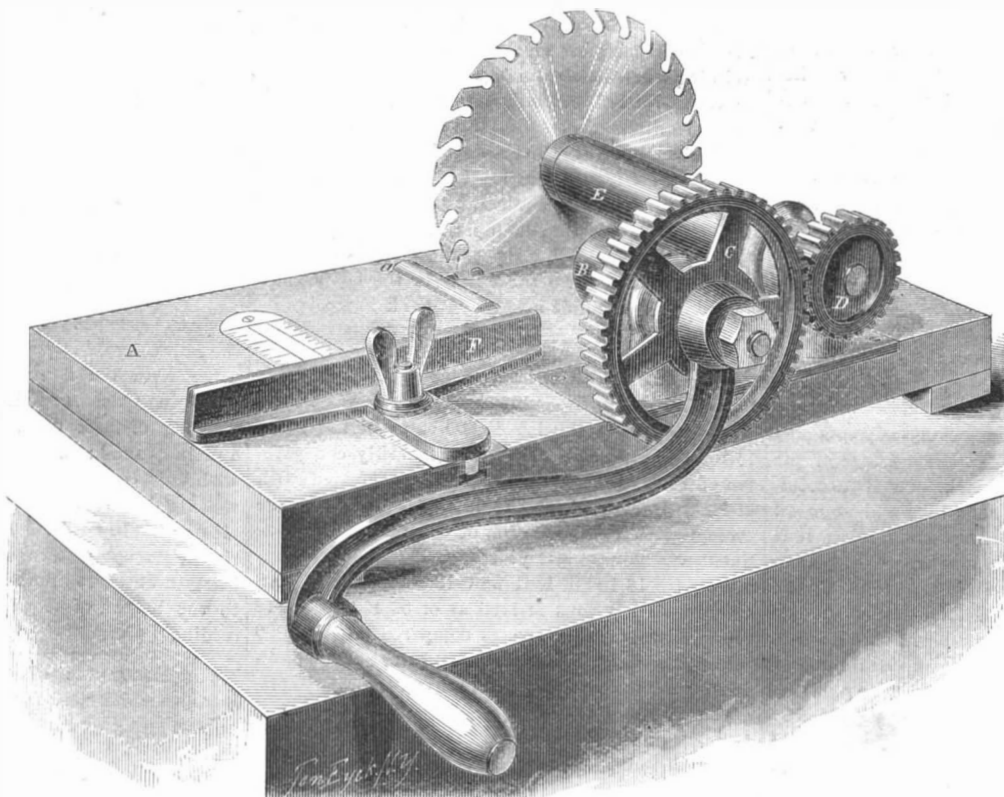
caloric engine, and it occurs to us that the combination of this press and the engine would make a very safe and efficient establishment for a country printer.

Persons wishing to purchase a press of this kind, or those desiring further information in regard to it, should address the manufacturers, R. Hoe & Co., 29 Gold street, New York.

Improved Hand Saw-mill.

The demand for light, portable and efficient tools is always great, and we think that there is a large field open to our inventors in this direction which

has teeth of a peculiar shape, and this peculiarity enables it to cut with much greater ease than would be supposed from the arrangement of the machine. The teeth are chisels as the reader will see by looking at the angle of inclination at which they strike the timber. They make a very clean cut, and we are assured that a "stick" as large as will pass under the saw-bearing can be cut with ease; this on the working size would be about four inches. The guide, F, and index at the side, gages the cut with reference to the saw, and the small roller, a, let into the frame, facilitates the entrance of the stuff to be cut. No feeding apparatus is needed on this tool, as from the formation of the teeth the timber is drawn in as fast as it can be cut. This saw mill is the invention of Thomas J. Wells, and was patented Dec. 16, 1862. Further information can be had by addressing him at 40 Dey street, New York.

**WELLS'S PATENT PORTABLE SAWMILL.**

seems to have been but partially explored. We illustrate this week another portable sawing apparatus which is exceedingly simple in its working parts. The bench or block, A, has a bracket or pillow-block,

to desist in her attack by them.

THERE are 83,635,000 tons of coal raised in Great Britain annually.

THE "MONTAUK" UNDER FIRE.—The *Montauk*, one of the *Monitor* iron-clads, has been in action, lately, near Savannah, and used her 15-inch guns for some time. The rebel work, however, was so massive that not even these tremendous projectiles were able to damage it. The range was long—600 yards—but we think in close action against any other iron-clad, the *Montauk* would soon make some demonstration that could not be misunderstood. The *Montauk* was struck repeatedly by heavy shot from the rebel guns, but was not injured or caused