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Improved Quartz Stamper.

The days of pan washing and surface mining of the precious metals are ended. The richest deposits, both of gold and silver, are found on the unyielding quartz rock, frequently in such minute particles as to escape the eye, yet so thoroughly impregnating the rock as to yield enormous returns to well-directed labor. An efficient mill, therefore, for crushing and disintegrating the rock is the first requisite in working quartz lodes.

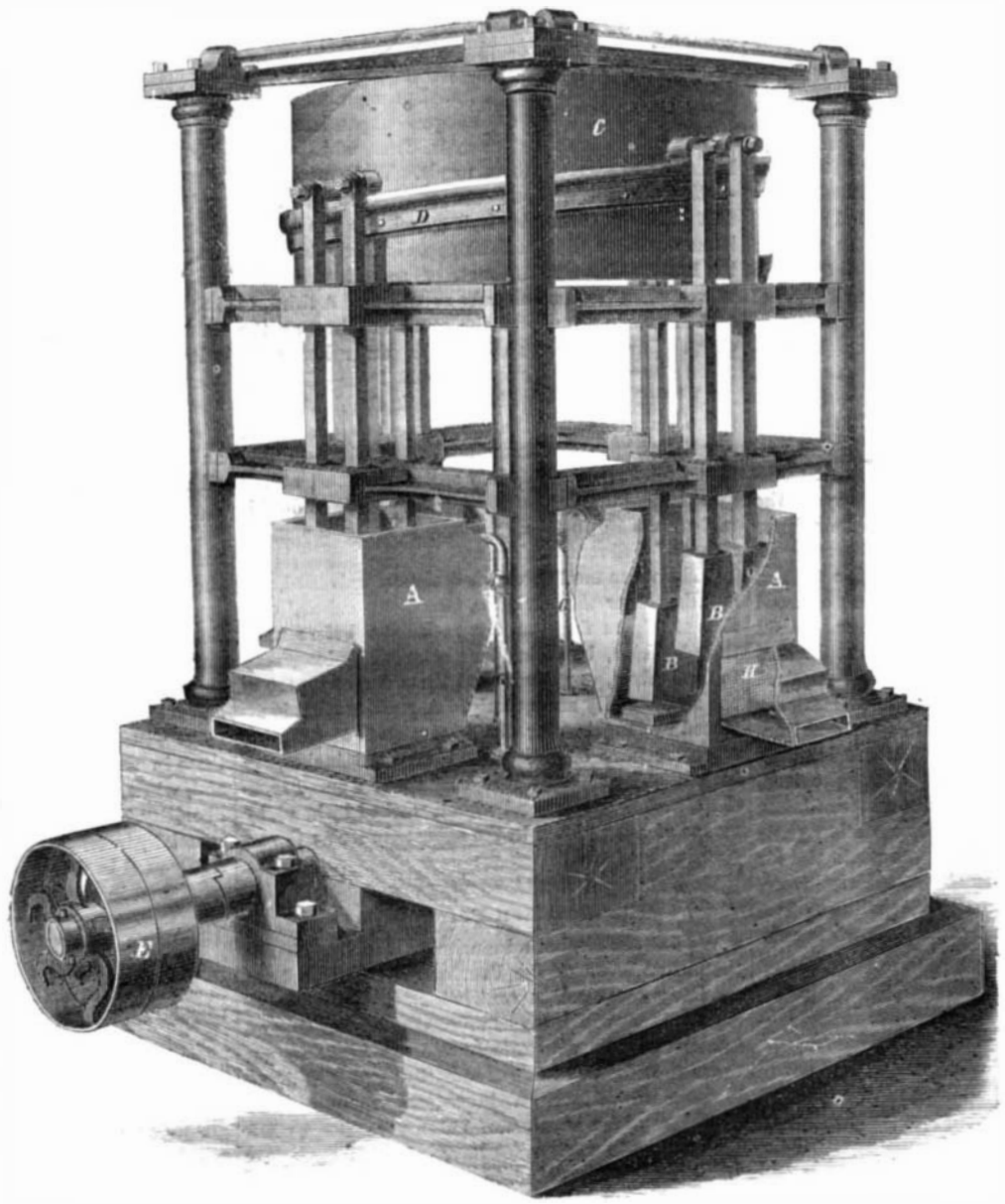
The improvement by the invention here illustrated consists in the mode of lifting the stampers by means of an inclined plane, for which the following advantages are claimed :— The mill works smoothly and opposes a uniform resistance to the motive power. The plane being long, and the lift gradual, the amount of friction is very small. The construction of the mill is compact and self-sustaining. It can be fed with more regularity, as all the batteries are with in the immediate observation of the feeder, and its compactness renders the expense of housing comparatively small.

The prime advantage, however, which it possesses over all other stamping mills consists in its ability to lift the stamps to any required hight, and thereby concentrate any desired amount of power in the crushing operation, by means of the superior velocity acquired in the fall of the stamps.

The framing of the mill may be constructed either of iron or wood, and is cheaper and more durable than any other of the same power and material.

The engraving annexed represents a mill of four batteries, A, having four stampers, B, each weighing 400 pounds and having a crushing surface of 64 square inches with a vertical lift of 18 inches. With the cam wheel, C, making 100 revolutions per minute, the stampers deliver 1,600 blows in the same time. Fed with 3·75 gallons of water for each stamper per minute, the mill will pulverize and pass through a wire gauze of one-twentieth of an inch, about 1,500 bushels of quartz in twelve hours, requiring 46 nominal horse-power for the operation.

The action of the machine can be readily understood by the illustration. The wheel or drum, C, has on its outer surface a spiral ledge, D, like a screw, the ends of which slightly lap and are vertically about 18 inches apart. The inside of the drum carries another incline precisely similar. The whole is driven by the pulley and horizontal shaft, E, which, by bevel gears, rotates the upright shaft, F. The stampers, B, are gradually raised by means of friction rolls traversing the incline, half by the inside and half by the outside spiral, and as the upper end of the spiral reaches the rolls successively the stampers are dropped in rotation. G are pipes feeding the batteries with water, and H shows a wire gauze through which the liquid quartz is discharged in a continuous stream.



PATENT QUARTZ STAMPER.

For further information address John Ahern, President "Excelsior Stamper Mill Company," Box 610, Baltimore, Md., or Davison, Stiles & Woolsey, 200 Water street, corner Fulton, New York, at both of which places working models may be seen in operation.

An English Ship-builder on American Engines.

Mr. Norman Scott Russell entertains the following views with respect to our beam engines:—"The American steamboat engine has long been a subject of wonder to the English engineer. It is ugly, straggling, and inconvenient-looking; its incompactness, and want of snugness and economy of room, make it the reverse of everything we think good in a steamboat engine. It certainly made the same impression on me that it has done on all my countrymen, but it was at first sight, and at first sight only. Daily the unfavorable impression became mitigated by familiarity, and after a careful study of its details and qualities, I do not think it possible to design an engine more admirably fit for its use and purpose, under the circumstances where it is applied. In this country there is not a single engine which can be said to be entirely English and preeminently suited to any one purpose. The American walking-beam engine, on the other hand, is universal in the States, and acknowledged to be best suited to their Eastern river navigation. I think it will be admitted therefore, that the permanence of this kind of engine in the American steamers must be held as *prima facie* proof of its excellence, and that it is entitled to our respectful consideration, and likely to reward our careful study.

"I have examined its structure in the best workshops of America, and have watched its practical working in their best steamboats. I have satisfied myself that it is cheaper in construction, lighter in weight, more economical in management, less costly in repair, more durable, and better suited for high speed, than any of our own engines would be. I think that for the navigation of large rivers, like those of China and India, it might be adopted with great advantage, and many of its details, indeed, might be adopted with advantage in any engine.

"One great advantage which the walking-beam engine possesses is that of being the only one which imposes no restraint on the engineer in regard to length of stroke or diameter of wheel. I ought to except the fixed inclined engine; but it takes up so much valuable room in the hold of the ship that it is now entirely abandoned for river steamers, although still in use for ferry boats. The beam-engine, on the other hand, takes up but little additional room in the ship in proportion to the increase in length of stroke, but only raises the walking-beam higher above the vessel.

"It will be seen that the shallowness of the water determines one material point in the structure of the engine. It becomes impossible to get a long stroke directly under the shaft, the position in which English engineers have shown themselves so anxious to place it. Driven from below the shaft from want of hight, the Americans have placed their

cylinder immediately behind the crank, and with the center of the cylinder on a level with the shaft. This necessarily throws the walking-beam to more then four times the length of the crank above the level of the shaft, which, with a 12-foot-stroke, is equal to 24 feet. This also determines four times the length of the crank as the length of the connecting rod, and four times its length for that of the walking-beam. These parts are, therefore, in tolerable working proportions, and they necessarily determine the arrangement of the minor parts of the engine.

"The condenser, as in the older James Watt and Newcomen engines, is directly under the cylinder, forming a continuation of it, so that the cylinder stands immediately by means of this contrivance upon the kelsons of the ship, which are there made particularly strong.

"The arrangement of the air and feed pumps is like the old James Watt pumping engines, so that it seems as if the Englishmen on the other side of the water were more faithful descendants of James Watt than those on our side. The inventive and volatile Yankee—as we think him—has adhered doggedly to tradition and the original James Watt engine, which has come to be regarded as an American institution.

"One more feature of these engines is very remarkable and very un-English. The floor and framing of these engines are of wood. But it must be remembered that wood is the American staple, as iron is ours—they prefer timber and know how to use it. We have given our preference and study to iron. But there is no doubt that their wooden framing and engine floor are well adapted to their light wooden boats, and work well with this kind of engine.

"The details of the engine are also throughout remarkably at variance with our present improved practice; remarkably like things we have long abandoned, and at the same time well suited to the circumstance.

"The details of the walking-beam, or great working lever, are quite as interesting a study as the wooden framing. It is quite plain that this lever has exactly the same work to do as the framing on which it rests; and one can quite imagine that at one time it too was a compound trussing of wood and iron. The fault of such an arrangement would be, first, the room it would occupy, and next the considerable quantity of complicated fastening required at the working points of the lever. The Americans have, therefore, made the center portion of cast iron, and the four sides of the beam, which is lozenge-shaped, form one continuous bar of wrought iron, the two diagonals of which are the cast-iron frame before mentioned. There would be no other parts of this lever, but for its having to work the air pump; and, therefore, a small subsidiary truss, similar in principle, is contained within. The whole of this walking-beam is a fine piece of workmanship, and nicely fitted and finished.

"The connecting rod between the lever and the crank is an exception to the principle which regulates the rest of the structure. It is a wrought-iron bar thick enough to bear both the push and the draw, and, therefore, looks out of proportion to the rest of the structure. It is trussed against vibration by two stays afore and abaft it, and its weight is possibly compensated for by the fact that it has to balance the piston and piston rod at the other end.

"The valve and valve gear are, perhaps, the most refined and successful parts of the engine, and are certainly those in which it differs most widely from ours. They have reduced its details to an absolute working perfection. Nothing can be simpler, quicker, or quieter than their best specimens of valve gear.

"There are four valves, two for steam and two for exhaust; each consists of two circular disks placed some distance from one another, so that the pressure of steam on the upper may be counteracted by the pressure on the lower disk, while one is made a little larger than the other to keep the valves shut by the difference of pressure. Two pillar tubes, with cross entablature at top and a cross plinth at bottom, compose the old steam passages. Two shafts, worked by separate eccentrics, and four wipers on these shafts, give independent motion to each of the valves, so that the best points of steam and vacuum can be independently given. The great delicacy consists in giving to the wiper the precise curve that shall open and shut the valve exactly when wanted, and do it quietly.

"The great theoretical defect of the balanced valve is the loss of steam between the valves and in the passages, and when high steam is used and great expansion, the loss increases in a high proportion. In an engine of 400 nominal horse-power, the loss of steam is about 10 cubic feet of steam at every stroke. It may be urged that there is an equal loss of steam in the steam passages of the slide valve, but this loss can and has been reduced to a minimum by placing the valve immediately over the steam port, whereas the defect in the balanced valve is incurable.

On the other hand, there are advantages peculiar to the pupet valve, which, for the purpose it is intended, render it invaluable. The amount of power required to open and shut the valves is so small, that the largest engines, some of them 500 horse-power, are worked with perfect ease by one man, although the backing, as before mentioned, is done entirely by hand.

"I have before mentioned the principal theoretical defect of the balance valve. But a practical difficulty presents itself in the unequal expansion of the valves and their respective seats, from which great leakage and loss of steam result. Various methods —all of them ingenious—are applied to overcome this difficulty. One way is to grind the top disk in its seat while a piece of thick paper is placed between the lower valve and its seat. A second, to set the valves when hot and already expanded. A third, to cast the valve stem from the same melting as the chest. [Mr. Russell is slightly in error here; the valve stems are cast steel, not cast iron.—EDS. SCI. AM.] And a fourth, which I think the best, is to make the angle of the conical seat so sharp that any little expansion makes but little difference; and that both valves are tightly seated, without, at the same time, jamming. The requisite angle to do this varies from 15 to 20 degs., according to the experience of different engineers.

"The valve motion, which is almost universal, and is called, after the inventor, 'Stevens's cut-off,' consists of wipers fixed on the rock-shaft before mentioned, which, by lifting toes, attached by long rods to the valves, open and shut them for any part of the stroke easily and quietly, A rapid motion is attained by lengthening the wipers and toes, which are sometimes 30 inches, and even 36 inches, in length. The starting gear consists of a small rock-shaft, with small toes and wipers, worked by hand, by means of a long lever in the same manner as the eccentric.

The Canadian Patent Laws.

We find that in both branches of the Legislature the Patent Laws of the Province have again been receiving considerable ventilation. This is a sort of stock subject which comes up session by session, and numerous futile attempts have been made to get them altered, but most generally by parties desiring to favor the American inventors, or perhaps we should say, the owners of patents in the United States, who, in many cases, have got hold of processes and machines invented in other countries, which they have managed to get patents for in their own country. Our Government have all along resisted the attempts to change the law in a direction to afford greater facilities to our Republican neighbors to get exclusive rights of manufacture or sale for their notions and nostrums in Canada, believing that when the question of a renewal of the Reciprocity Treaty came again on the tapis, the concession would count for something; but they were evidently reckoning without their host, for Brother Jonathan never so much as adverted to the subject, or if he did, we must have overlooked the matter. No, no! he was too much impressed with the magnificent advantages he had to offer us, or perhaps we should say, to withhold from us, to advert to such a trifle as the introduction of his patents into the Provinces. But to return to our muttons, our rulers seem to have abandoned the idea of keeping the door close shut against foreign inventions, be they American, French, or Chinese. Not that they have proposed a new policy, or offered to bring in a measure to change the law, but they recommend, or rather suggest, to Parliament, that hereafter, each application for a patent right should be received and considered solely upon its merits; that is, that the advantage of the introduction of such a patent into the country should be examined with reference to the country itself, and not so much, if at all, with reference to the inventor or patentee. This seems reasonable enough; but the Honorable Mr. Ferrier, in the Legislative Council, further suggested, and, as it appears to us, very properly, that, in granting rights of this kind, it should always be made a condition that the article or thing to be produced or manufactured under such patent should be produced or manufactured in the Province. This was hitting the nail right on the head; for, in the past, rights have been granted by special legislation to aliens who, when once in possession of their parchment, went away and very coolly informed us that if we wanted the article they had acquired the exclusive privilege to make or to sell, we must go to Connecticut, Baltimore, or some other equally accessible place where the manufactory was situated, lose time, pay the packing, freight, and duty, or go without. But for these patents. our own handicraftsmen would have made the machines, and sold them at half price; and so our people, instead of being benefitted by the arrangement, were in fact injured. Of course our neighbors complain that we pirate their inventions, and, although it may be an ugly word, there is probably some truth in the allegation; but then, if the American patents were very rigidly inquired into, we apprehend a very considerable number would be found to have been got in the same way from other nations, and not a few from Canada. But we apprehend it hardly comes with very good grace from the American people to complain of this wrong, when they themselves have obstinately resisted all attempts at the establishment of an international copyright law, or, in other words, an international patent law for books. They have all along helped themselves to the best without saying so much as "by your leave," and, until recently, could undersell all other nations, for the simple reason that they paid nothing to the authors. When they have done justice to the literary men of Europe, by protecting the labor of their brains from the piracies of their booksellers, then they may talk with some show of reason of the wrong we have done them in the matter of mowing, thrashing, sewing, and other labor-saving machines. We trust Parliament will consider every application submitted to them in the light of the recommendations made, and, while exercising all proper neighborliness and liberality, see to it that, as much as possible, and especially in respect of inventions likely to be extensively used in the country, the manufacture shall be carried on in the Province.—*Quebec Gazette.*

LEAD IN SOUTHERN ILLINOIS.—Recent geological investigations, verified by actual experiments, seem to establish the fact that a large portion of Southern Illinois, contiguous to the Ohio river, contains valuable deposits of lead. The Louisville *Journal* says that "in the opinion of Professor Lyon, which is confirmed by the uniform experience of miners, there can be no reasonable doubt that the whole region is filled with like veins, lying from thirty to fifty yards apart, yielding ore in paying quantities at a depth below the surface varying in the main from twenty to thirty feet, and reaching down to the enormous depth of from thirteen hundred to sixteen hundred feet, growing richer the deeper they descend. Science and experiment unite in warranting the conclusion that the earth there is literally swelling with lead ore under conditions of development the most inviting to capitalists."

CEMENT FOR MILLSTONES.—Our readers doubtless remember that many persons were poisoned from eating flour ground on stones in which lead was used to fasten them. It would be valuable to many persons, especially those who use lead, if some experienced miller would send us a recipe for a cement for this purpose. All the hand-books on milling are silent on this subject.

AN American watch factory at Elgin, Ill., with $250,000 capital, will be ready to make sixty watches per day by September. Most of the stockholders were formerly workmen at Waltham.