

Improved Clay Crusher.

This is an improved form of machine for the crushing of clay and other similar substances, preparatory to its manipulation with water to render it plastic and fit it for molding.

Its construction will be readily understood by reference to the drawings; Fig. 1 being a perspective view, and Fig. 2, a cross section through the crushing cylinders.

These cylinders are armed with cogs as shown in both engravings. Between each row of cogs or teeth are formed deep rectangular grooves. To metallic plates bolted to the cross-pieces of the frame of the machine are bolted bars, or scrapers, distinctly shown in Fig. 2, and in perspective Fig. 1. These bars are not bolted down rigidly but are allowed some play to accommodate themselves to any slight inequalities of surface in the grooves, into which their points penetrate. Their office is to scrape off the clay compacted between the cogs and in the grooves of the cylinders. The crushed material then falls directly beneath the cylinders, from whence it is removed as occasion requires.

The arrangement of the gearing with the fly-wheel for regulating its movement will be readily understood upon inspection of the engraving Fig. 1.

Instead of using cylinders with cogs and grooves cut on them, the inventor prefers to construct toothed rings which may be fastened on the central shafts or cylinders, and separated by collars which form the bottoms of the grooves.

When this form of construction is adopted, the toothed rings and collars are firmly bound together by rods and nuts running parallel with the axes of the cylinders, the object of which is to prevent their spreading by the wedge-like action of the clay as it crushed into the grooves.

It will be seen that the machine is perfectly free from any weakness arising from complications, and that it must not only be effective but durable in practice.

The difficulties designed to be overcome by this invention and which led to its construction are sufficiently instructive to the general reader to merit notice.

The machine is intended to crush any hard, tough clay, whether it be dry, half dry, green as dug from the pit, or mixed, for the purpose of making it into brick.

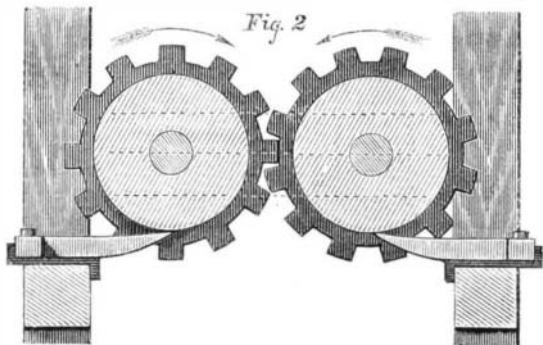
It crushes, tears, and disintegrates it so that the water percolates freely through it, when put into a pit or vat to soak, preparatory to grinding it into "mud," as the prepared clay is called by brickmakers; after which, being tempered by means of the common tub tempering mill, or by any other means, it becomes perfectly homogeneous without which no clay will make good brick.

It does its work thoroughly, rapidly, and with about the same power as required to drive the common tub-tempering mill.

It was gotten up more especially to prepare *fire-clay*, a very tough, hard clay, used in making fire-brick; but is equally useful in preparing any common tough clay, such as cannot well be used without freezing or drying.

Tough, hard, fresh dug clay from the pit, passed directly through this machine, will, we are assured, soak and temper into homogeneous "mud," equally as well as that which has been disintegrated by means of frost or drying.

Brick, made of mud, a part of which is in lumps—large or small, and a part plastic, are liable to crack, and are generally very rough or uneven, the plastic parts shrinking away from the lumps; but if the clay is properly disintegrated by any means the mud becomes homogeneous, that is, it becomes all plastic alike, and in drying and burning the shrinkage is uniform. The adhesive quality of the fibres draws the parti-

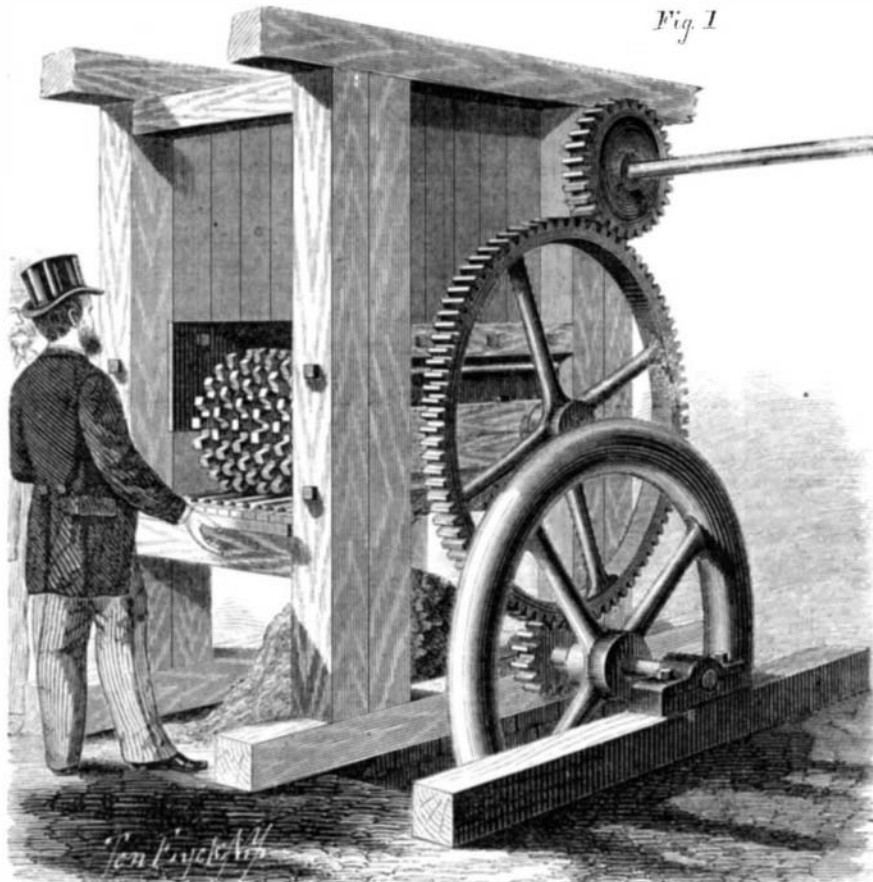


cles composing the brick close to each other, and when burned the substance becomes like stone, fine or coarse, according to the nature and quality of the clay and sand used in the composition. The finer and tougher the clay used, the more solid and durable will be the brick, especially for wear in pavements and to bear great weight.

The most common method of preparing fire-clay and other tough clays, is to chop it by hand with spades, but this method leaves it in small solid lumps, impervious to water, and is expensive, requiring the labor of eight or ten men to prepare the clay as fast as the clay crusher will do it, and then it is very imperfectly prepared.

If clay is thoroughly dried, there is nothing better to crush it than the common bark mill, such as is used by tanners for grinding bark. The pores being open, water dissolves and readily makes it homogeneous, but if any of the clay be but half dried it sticks to the teeth of the mill and at once clogs

it; but practically clay is seldom dried or frozen to any great extent, especially fire-clay. This fire-clay (as it is called on account of its peculiar properties for resisting fire) when used for manufacturing iron and other like purposes, is found east of the Allegheny mountains, mostly in the town of Woodbridge and vicinity, in the State of New Jersey; and the best quality, such as is used for making fire-brick, is worth six dollars a tun at the mines. It is deposited from twenty to thirty feet below the surface, the surface being all cleared off down to the clay. The clay is dug with gouge-formed spades which require the full power of a man to drive them into it, being dug in lumps or "spits" which are thrown out of the pit by the hands of men, sometimes from a depth of ten or more feet on to a platform, ready to transport either to the factories in the vicinity, or to the docks for shipment. The spits of clay, as they are called, are thrown into wagons,

**HALL'S CLAY CRUSHING MACHINE.**

carted to the docks, and put directly into vessels for transportation to the factories in Philadelphia, Boston, Troy, Buffalo, and other places, or stacked in heaps ready for shipment; and when delivered at the factories is stowed in large heaps under cover, a portion of it dry, a portion half dry, and a large portion about as green as when dug from the pits, and occasionally, when some dry clay is put in the bottom of the vessel and the vessel leaks, a portion of mud. Thus, when the cargo is discharged we have dry, half dry, green clay, and mud all mixed together; and this condition of the clay when deposited at the works, was the moving cause of the invention of the clay crusher.

The bark mill for grinding dry clay, and a revolving cutting machine, which cut the half dry clay into thin slices, preparing it much faster than the chopping process with spades but not much better, were formerly employed; but a machine that would work the clay in all conditions combined, was the desideratum sought.

After several costly experiments, the present machine was found to work to the entire satisfaction of the inventor, and the experimental machine has, we are told, been constantly at work, eight months or more, at the factory of Hall & Sons, Buffalo, readily devouring every kind of clay put into it, without the least difficulty. This firm has also used one of the crushers at their Perth Amboy Factory several months, and have abandoned all other means of preparing clay.

The machine is necessarily strong and heavy, weighing over two tons. Experiments had to be tried on a full size machine, and were costly; and to reimburse himself either through the exclusive use of it by the firm of which he is a member, or by both using and selling to others, the inventor obtained a patent, through the Scientific American Patent Agency, January 11, 1870.

Not wishing to monopolize the use of so useful a machine, he now offers it to the public for sale. At present machines will only be made to order. They can be seen in operation at any time during working hours, at A. Hall & Sons' Fire Brick Works, at Perth Amboy, N. J., or at Hall & Sons' Fire Brick Works, Buffalo, N. Y.

For machines or information apply to Alfred Hall, Perth Amboy, N. J.

The Fear of Men in Animals.

The fear of men in animals is a slowly-acquired instinct. Mr. Darwin, in his account of his travels, gives some interesting instances of the fearlessness of birds little exposed to man in South America. The crew of Byron's vessel were astonished at the manner in which the wolf-like dog of the Falkland Islands approached them merely out of curiosity. Compare these traits with the admirably organized expeditions for the plunder of baboons, elephants, etc., and the rude customs acted upon for self-preservation of the half-wild

dogs of the Peninsula and the East, wherein the care of the weak and young, the usefulness of sentries, the value of signals, the difference between sham and real danger, and the advantage of confusing traces of retreat, seem all to be known, and it will be pretty evident that man, the thinker, has to a considerable extent reacted on animals wild and domestic. Even in my own quarter it is the steady belief of the shepherds that the common sheep-dog has progressed in intelligence and docility within the last fifty years by careful selection. "Where the dog is not valued for intelligence, as in some Eastern countries, it is a much more stupid animal than with us."

The China Trade on the Pacific Railway.

Some moons ago, says the San Francisco *News Letter*, we were tossing high our ready caps in air at the supposed advent of the Oriental merchant, who was believed to be awaiting a pilot just outside the heads, with a ship full of tea, silk, porcelain, and curiously-carven ivory, which he was to dump upon our wharves and permit us to send *via* Chicago, to Liverpool. He didn't come. Fact is, he has gone round the other way, through the Dutch Gap canal at Suez. Whence this cold shoulder? After having expended a few hundred millions in preparing a highway for the nations, the nations stubbornly decline to walk over it. The gorgeous East, albeit somewhat disposed to loll sleepily upon divans and smoke opium, has yet a business kind of eye, and sends his wares by vessels having immediate dispatch.

Practically our highway of the nations (we are not alluding to the sea) stops abruptly at the Pacific Mail Company's wharf. We run a monthly line of steamers to China; the Peninsular and Oriental run a weekly line. That is the delicate shade of difference, and it is quite sufficient to cook our commercial goose.

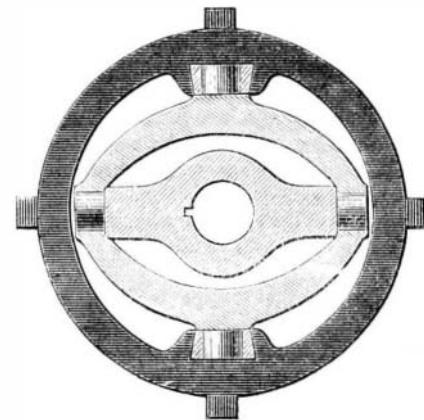
We are not sufficiently affluent to do better, although we have the steamers all afloat, and Thomas Mooney is clamorous to have them put on. If this were a private affair of our own, affecting only the interests of California, we could regard it with some faint touch of satisfaction. It is a charger of a radically different hue. The entire country is interested in securing the trade of China, by which alone we can hope to harvest what we have sown from the Missouri river to Pacific tide-water. We must get our money back on that railroad, and to do so the railroad must be virtually extended to Hong Kong, by semi-monthly

trips of the Pacific Mail. This will do it, and Congress must do this. It is arrant nonsense to talk of doing it without additional subsidy. The Company can afford to dispatch a steamer monthly, but some years must elapse before they can afford to do more. Indeed, if something be not speedily done to secure the China trade, they can never afford it, and we shall have the gratification of sitting meditatively by the seaside with our chin in our palms, and translating the murmur of the waves into a pronounced jeer at a very Stupendous Ass.

UNIVERSAL BALANCE FOR MILLSTONES.

A correspondent of the English *Mechanic* has invented a universal balance for millstones, of which we copy the engraving.

The invention consists of an outer ring built in or let into the stone 4 or 5 inches from the face. In this ring are two



dovetail grooves, and in each a brass step is fitted, so as to slide up and down tight; these steps are regulated by two set screws, fixed in the top side of the ring; inside this ring is another oval one with a stud or center on each side fitted into the above-mentioned steps; and inside this ring is fitted the driver; all the centers are equal in length and line.

CHARLES LEVER, the "Harry Lorrequer" of many a novel, the "Cornelius O'Dowd" of *Blackwood*, and the British Consul at Trieste, requires no less than eighteen hours of sleep a day. He writes but two hours at a time and never makes an alteration.

A WRITER in *Notes and Queries*, says: "An old gentleman informed me that he had made it a constant practice for the last fifty years, during the frost, to watch a mole-hill, and had always found that if the mole threw up fresh earth, within forty-eight hours the frost would be gone."