SAW MILL BUILDING.

BY J. H. MINER.

IN BUILDING a saw mill or medium mill to manufacture good lumber cheaply, we will begin first at the engine and boiler. A good center-crank engine and straight tubular boiler are best. An engine of this kind possesses many advantages, in that it is set and keeps in line, and is more compensating than a side-crank, and is less expensive to set. The fire-box boiler will not steam well unless dry fuel is at hand, and will not burn the saw dust. They are difficult to clean, which few mill men pay close attention to. The slabs, in many cases, can be worked into lath, which means money, or sold for fuel. In some places the dust commands a good price. The idea is, burn the worthless stuff. It is cheaper to get rid of the slabs and edgings with a burner, as no mill can burn all the slabs, but can burn the dust, which is cheaper firing, as an intelligent boy will keep steam.

To burn dust the boiler must be set with the end say two feet ahead of the discharge of dust from the saw The conveyor will traverse this route. It must be made of link chain belting with an iron cleat every eight or ten feet, with two spouts, one on each side of the boiler, made of sheet iron, with cut-offs. Have stack plenty high and there will be good draft if there is ample grate surface, and after getting your furnace hot your dust will dissappear without a cent of outlay except a fireman at fifty cents per day

If slabs are to be used for fuel, set your boiler the opposite way. Have a glass water or float guage in sight of the sawyer. Use a good plunger pump or an injector that can be regulated.

Set the engine on a heavy piece of timber, well bedded in ground and of good length. Build up from this the height you wish engine, using bolts clear through, with all timbers keyed firmly together. A brick foundation is not good unless set very deep, with broad base, which costs considerable more. On every bearing of your engine have a thoroughly reliable oil cup and use a sight-feed cylinder lubricator, all which should come with the engine and will if you insist. Only a drop of oil occasionally will keep your engine cool. Use a cup that will save oil, and that you can depend on while at the saw.

By all means exclude your engine from dust and dirt —its enemies. A few sash cost but little and the lumber is handy. Build an engine room, having the light so arranged that the sawyer can see the engine. Use a reliable compound ring packing for rods; it will last four times as long as hem, no friction nor cutting of rods and is quickly inserted. Your engine properly set requires no engineer but the sawyer's attention morning and noon. Exclude the dust and use reliable oilers and you will have a new engine when your neighbors' has burned, thumped and worn itself out.

A high speed engine is the best. They cost less per horse-power, as a 40-horse slow motion will cost as much as a 60-horse fast engine.

Buy a saw mill with a heavy husk and steel mandrel with long bearings. The driving pulley should have a heavy rim, which should be well balanced. Turning a pulley inside does not insure perfect balance. The heavy rim will add to the cut and will carry a slacker drive belt. A thin-rim pulley has no momentum in it to relieve the saw in knots and tough places.

The feed works should have very broad face pulleys, that they may be easy to regulate and quick in operation. The feed-belt should not be less than four inches on a small mill, while six inches will be better. Broad face frictions give the sawyer a variable feed, while narrow pulleys quickly wear from excessive pressure, slipping and burning. There are a great many dollars annually lost on trifling feed works.

The carriage should run on planed ways, with large tracks with axles extending across. Use a good ratchet set works with reliable dog. Put in an overhead log turner. Put in live rollers, which can be cheaply gotten up for small mills, and swing cut-off saw, with a measure on each side, so that defective lumber may be trimmed. Use a light car and ironed track for distributing lumber.

Ground mills seldom have an edger, and mills of less than 10,000 capacity do not need one. Buy the best extra rubber belting. Use belt hooks properly and every belt in your mill will be endless and reliably fastened. Use a good inserted tooth saw and top saw, if timber is large.

MILL FIRES AND INSURANCE.

BY C. R. TOMPKINS, M E.

THE good working qualities of almost any piece of machinery frequently depends upon the foundation upon which it rests. It is not only much easier to arrange and adjust the several parts of a new machine in the first instance, but it is much less trouble to keep the machine in perfect adjustment afterwards, where a good foundation is provided. But aside from this it becomes doubly so in case of fire. Machines that simply stand upon the floor, no matter however good and strong it may be, when it is burned away they will settle down so as to frequently stand upon two legs, if they are not thrown over; with such conditions it does not require a very hot fire to warp them so much out of shape that but little is available for the purpose of rebuilding.

It is a well-known fact to all iron-workers, that cast iron will stand considerable heat without material injury, where there is no strain upon it; while, on the other hand, where it is submitted to a strain, it requires but a moderate heat to produce a permanent set. For this reason, machines that have passed through a fire are more frequently ruined than from the actual heat they are submitted to. Heavy planing machines standing upon a good stone foundation have gone through a pretty hot fire without permanent injury, except to some of the lighter portions and pulleys, that may be replaced at comparatively a small expense; while others, equally as heavy, without an independent foundation, have settled down in such a shape as to be completely ruined by warping and breakage, with much less heat than the former.

With steam engines this is more particularly the case. The method of placing an engine upon a wooden bed and supporting the end of the main shaft upon a wooden support, which is extensively practiced in all parts of the country, especially in saw mills, can not be too severely condemned by practical engineers. Frequent cases are met with where engines thus set up have passed through fire and been totally ruined by being warped out of shape and cracked; whereas, if they had been mounted upon a good stone or brick foundation, and the end of the shaft also permanently supported upon the same kind of structure, the damage from the same fire would have been slight, and a few dollars would have made the loss good. By being put up in this manner, without permanent support to the end of the shaft, as soon as that burns away the whole weight of not only the shaft, but the fly-wheel and pulleys, is thrown upon the main box. The result is the engine bed, which is one of the most important parts, is twisted out of shape and ruined. If no other part but the bed is totally ruined, the expense of puting in a new bed will frequently amount to nearly as much as a new engine.

As a rule, however, if the engine and boiler are properly set up, with good foundations, in case of fire they suffer less damage than any other part of the machinery in a mill Yet we frequently find mills that carry a large amount of insurance upon the engine and boiler, and much less in proportion upon the lighter machinery which is always liable to much more damage by fire, if not a total loss. In a large majority of cases where a mill is burned, especially a planing mill or a saw mill, it will be found that the insurance will seldom cover the loss on the machinery and tools, while the engine and boiler, if properly set, are not as a rule damaged more than one-half that amount.

Therefore, where a certain amount of insurance is carried, it is for the advantage of the mill owner to place the engine and boiler in a one-story detached building. Place them on good substantial brick or stone foundations, and carry a small amount of insurance. Put the bulk of the insurance upon the machinery in the mill, that is more liable to be totally destroyed in case of fire.

THE PRESERVATION OF TIMBER.

IN THE history of attempts at prolonging the life of timber some very curious expedients are met with. In 1836 Dr. Boucherie, a French chemist, tried to impregnate timber by vital suction—that is, by tapping the tree and allowing the ascending sap to carry up a preserving solution. This, however, did not give satisfactory results, and in place of it a cap was supplied to the end of a newly-cut log, and the solution forced along the sap ducts by hydraulic pressure. Sulphate of copper was the chemical used, and when it was applied to newly felled timber it gave good results. Lime water has been tried, and also salt, but the effects have not been such as to encourage the repetition of the treatment. There is a strip of road in the Union Pacific railroad, in Wyoming, where the sleepers do not decay at all. The analysis of the soil shows that it contains sodium, potassium, chloride, calcium, and iron, which act as preserving agents. An inventor named Foreman brought out a process by which dry arsenic and corrosive sublimate were inserted in holes in sleepers and covered with plugs. The materials became dissolved and efforesced on the surface, when the cattle licked them and died by scores. The farmers rose in arms and forced the railroad company to burn all the sleepers. One of the best of recently devised methods of preserving timber consists simply in soaking the timber in melted napthaline for a peroid varying from two to twelve hours, depending upon the bulk of the piece. A temperature of 180 to 200 Fahrenheit is obtained by placing steam pipes in the bottom of the tank which contains the material. Simple as the process is it possesses a still more valuable feature. It can be applied to green timber, thus obviating the necessity of a long and expensive process of seasoning The napthaline penetrates the pores of the wood, decomposing the albumenoid compounds and displacing both sap and water. It then becomes fixed, and the whole substance is thoroughly permeated with an antiseptic of a permanent character.

ANTIQUITY OF THE CARPENTER'S PLANE.

A VERY interesting discovery has been made at the Roman city of Silchester The excavators came across a dry well, which, on being explored, proved quite a little museum of antiquities. Some fifteen feet down, a correspondent says, the diggers found an urn-shaped pottery vase, about a foot in length, quite intact, and curiously enough, protected by lumps of chalk built around it. The vase, which probably originally contained some precious substance, was, however, quite empty. Above it were deposited a great number of iron implements, most of which were in a wonderful state of preservation. They seem to have been the tools of a carpenter and a coppersmith or silversmith, with some miscellaneous objects of blacksmith's work thrown in. The principal specimen is a carpenter's plane of quite modern type, although unquestionably more than 1,500 years old, three or four axes retaining their fine cutting edges and quite serviceable, a number of chisels and gouges of all shapes and sizes, hammers, adzes, saws files, etc. In the smith's department may be specified a brazier for burning charcoal, quite complete; two or thee anvils of different sizes and shapes, a fine pair of tongs adapted for lifting crucibles, a curious tripod candelabrum lamp, or candlestick, and several other curious objects the precise uses of which have not yet been determined. In addition there are several large bars of iron. Probably more will be found deeper down in the well. This is undoubtedly the most important find at Silchester since the discovery of the bronze Roman eagle, now at Strathfieldsaye, some years ago.

One very important cause of deterioration in boilers is due to the fact of their becoming too small to do the work without forcing, so that the pulsations of the engine cause a well marked succession of shocks on the boiler, which result in the weakening of the material. By placing one's hand on the head or shell of the boiler, the vibrations of the metal can be felt similar to the rising and falling of a man's chest while breathing.