Magnetic Iron Sand in New Zealand.

From the report of the United States Consul at Auckland, New Zealand, it appears that the government of that colony offers a bonus of £1,000 ($5,000) to whoever will first produce, from native ore, in the colony, 200 tons of iron in blooms. In answer to this demand a furnace was established on February 8, at Auckland, the furnace being on the plan of the invention of Joel Wilson, of New Jersey. The managers claim that they can manufacture iron in Auckland much cheaper than it can be brought from England. The consul says that the United States government has granted as many as thirty-eight patents for electric separators of iron ore, and that one of these was successfully operated in the separation of iron sand obtained at Block Island, off the Connecticut coast, by the patentee, D. C. McCotter Arthur, who cleaned one hundred and twenty tons per day by means of his magnetic separator.

Similar means for procuring the pure iron free from sand have been tested in New Zealand, so far that a furnace on the American plan has been established at Onehunga, a few miles from Auckland.

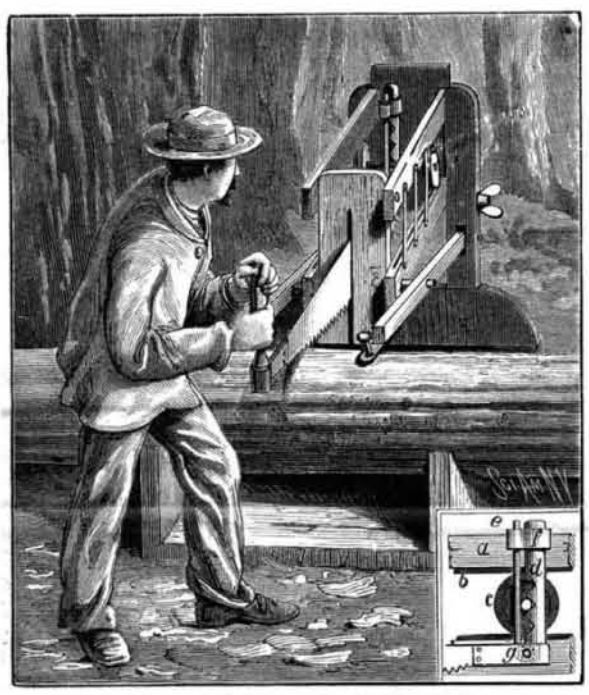
This iron sand is so pure that a portion sent to England was worked into steel for cutlery without the intermediary of puddling, being melted, cast, and at once forged under the hammer. The supply is absolutely unlimited, and cannot be estimated even by millions of tons. The ordinary yield of the sand is from fifty to seventy per cent of the mass. The magnitude of the deposits may be inferred, if not comprehended, by the statement that in the neighborhood of Waniku, in the province of Auckland, the area of this magnetic iron sand is so great that it extends from the shore miles in width and in length, submerging rocks, trees, shrubs, and covering even the tops of the distant hills.

The existence of this iron sand was well known to the earlier voyagers and later to whalemen and venturesome traders. On approaching the shore the masters of vessels that first visited these islands noticed a variation in the magnetic needle of their compasses, and attributed it to deposits of loadstone along the beach.

This deposit, the consul thinks, was formed by the action of the sea, of running streams, leaping torrents, and profuse rainfalls on cliffs, banks, and soil that hold in loose embrace the heavy particles of iron originating in volcanic rocks. The sand is of a bright blue, its attrition of particles preventing the settlement into the red oxide which would cement its grains, and it is in so fine particles as to be easily driven by the wind, forming on levels or easy slopes wavy, undulating ridges that simulate the waves of the sea.

CROSS CUT SAW FRAME.

The log is arranged on supports at one end of the base, and at the other end of the base is an upright frame fitted with guide grooves, in which the head of the saw frame can be shifted up and down when it becomes necessary to raise or lower the saw guides for altering the height of the saw, and can be secured in any position by a bolt and nut. Attached to the rear uprights are braces, extending upward and forward, to be employed for staying the logs by dogs. The bars for the support of the rails are pivoted to the braces at a point a little short of where the log rests. These bars, shown at *a*, in the small figure, are connected by stays, and between their forward ends is a vertical bar provided



SCHOOLEY'S CROSS CUT SAW FRAME.

with a slot in which a saw is free to rise and fall. The saw is connected at the end which runs in the guides to the axle of the wheels, *c*, by the notched handle, *d*, and the rod, *e*, which is pivoted at *g*, and secured to the upper end of the handle by a ring, *f*, so that by slipping the ring off the upper end of the handle the rod may be swung back to allow the saw to be set up or down as required. The handle extends up between the upper bars of the guides for holding the saw in a vertical plane. The wheels run between rails, *b*, on the guides.

This invention has been patented by Mr. Andrew Schooley, of Litchfield, N. Y

HOLLOW AUGER.

In the work of forming tenons on the ends of wheel spokes, and in similar work, the article is first pointed down with a knife or fore auger, as the hollow augers will not take hold upon the blunt end of the spoke. This is obviated by the hollow auger recently patented by Mr. James A. Rodman, of Lebanon, Texas. The head or yoke is made in one piece of a ∩-form, and is provided with a shank for being clamped in place. At the lower end of the head are the jaws, *a b*, Fig. 1, forming the hollow auger, *a* being what is termed the "off jaw," and *b* the jaw carrying the cutter. The two jaws are attached at one end by a pivot pin, so that they may be moved according to the size of tenon that is to be cut. Thin outer or moving ends are at-

RODMAN'S HOLLOW AUGER.

tached to the opposite leg of the head by a clamping screw which passes through a slot in the leg, so that the jaws may be held firmly, and a graduated scale is provided for adjusting. An arm having forked ends is pivoted to each side of the head, and at the lower ends are formed the flaring jaws of the fore auger, one of which is fitted with a cutter. These jaws come beneath the jaws of the hollow auger when the arms are brought together, and in this position they are held by the latches, *c c*, the ends of which catch into the jaws, *a b*. A spring, serving to spread the forked arms when they are released, is indicated by the saw-tooth line at the top of Fig. 1. In one of the arms of the head is a slot in which moves the stop, *f*, regulating the depth to which the spoke enters the tool and consequently the length of the tenon. In using the tool the jaws, *a b*, are set to the diameter of the tenon to be cut, the stop, *f*, is adjusted, the arms are brought together, and the latches caught. The tool being applied to the spoke, the fore auger bevels the end. When the beveled end reaches the triggers, they are raised, when the arms spring out, leaving the hollow auger free to act.

Roof Water as a Motive Power.

It has occurred to a gentleman resident in Georgetown, West Indies, that a possibly valuable source of energy is allowed to run to waste in the tropics in the shape of the water which pours off the roofs of the houses whenever there is a shower. The gentleman in question, in a lecture delivered recently before a local society, said that, "having been frequently struck by the great volume of water discharged from roofs during heavy tropical rains, it occurred to me that the power so wasted might be utilized in some way by converting it into electricity by the following means: The water from each roof might be conducted into one main downpipe, in which would work a small turbine wheel driving a dynamo electric machine, the electricity so developed by every passing shower to be stored in accumulators of the type of Faure's secondary batteries. These, as they became charged in variable time, depending on the rainfall, could be collected and stored at central depots, from whence the power could afterward be distributed uniformly, either by electro dynamic engines, or utilized directly for electric lighting!"

The Value of a Compost Heap.

The gardener and farmer are not apt to sufficiently appreciate the importance of gathering into heaps vegetable substances of all kinds to convert into manure. *Land and Water*, calling the attention of its readers to the subject, suggests the following plan for a compost receptacle:

In some convenient place lay down a sound floor of concrete, and have a roof to cover it, but open at the sides. Upon the floor collect weeds and every other kind of waste vegetable matter, road scrapings, border edgings, in fact the greater the variety and the more of it the better. Keep it moist (not over wet), and turn it over occasionally—at the same time a little salt may be sprinkled over it with great advantage. When sufficiently decomposed this will form a most valuable manure, highly rich in nitrogen in such a form as to be readily taken up by the crops. Use the liquid of cattle and the domestic liquid waste from the house, and it will surprise many what a store of good manure will soon accumulate.

The Creosoting of Timber.

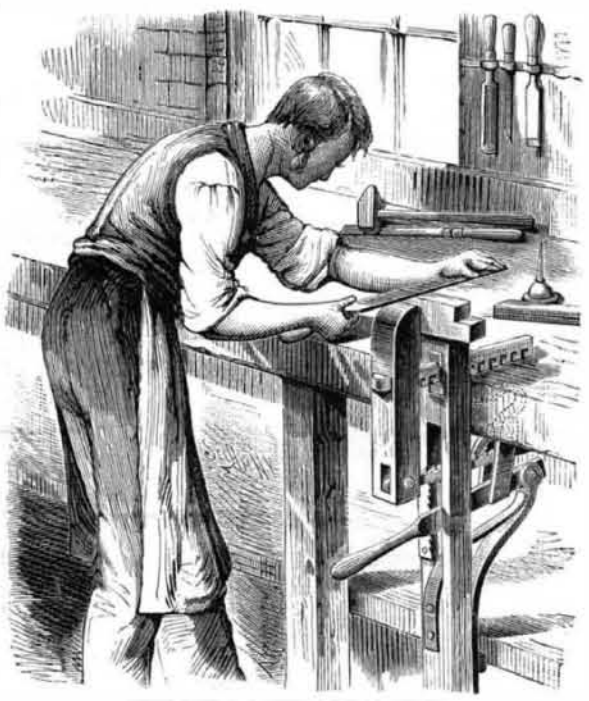
As is well known, the preservative properties of creosote are owing to its preventing the absorption of the atmosphere in any form, or under any change of temperature. It is noxious to animal or vegetable life; and it arrests all fermentation of the sap, which is one of the primary causes of dry rot and other species of decay in timber. The action of creosote—says Mr. Bale, in his work on "Saw Mills: Their Arrangement and Management"—may be thus described: When injected into a piece of wood, the creosote coagulates the albumen, thus preventing any putrefactive decomposition; and the bituminous oils enter the whole of the capillary tubes, incasing the woody fiber as with a shield and closing up the whole of the pores, so as to entirely exclude both moisture (water) and air. By using creosote, inferior porous timber and that cut at the wrong season, and therefore sappy, may be rendered durable. The Bethell system of creosoting is as follows: The timber is first thoroughly seasoned and cut to the required dimensions. It is then placed in a wrought iron cylinder, fitted with doors that can be hermetically closed by means of wrought iron clamps. The air and moisture contained in the wood are then exhausted from it, and from the cylinder, by means of a powerful air pump. The pores of the wood being now empty, the preservative material (creosote oil) is admitted into the tank. When the wood has received all that it will after this manner, more oil is forced into it by means of hydrostatic pumps, exerting a pressure of 120 pounds to 200 pounds per square inch. This pressure is maintained until it appears that the proper quantity of creosote oil has been absorbed by the wood, which is determined by a gauge. Timber intended for railway sleepers, bridges, etc., should absorb 7 pounds of oil per cubic foot; and timber required to be protected against marine insects, etc., requires at least 10 pounds of oil per cubic foot. The cost varies from 4d. to 5d. per cubic foot, according to the quantity of oil required.

Cable Telegraphy.

According to recent trials of the speed of working on the Jay Gould cables laid across the Atlantic from Penzance to Canso, in Nova Scotia, 1,000 code words were sent from Penzance and received at the Canso station in 81 minutes, including all repetitions and corrections. The 1,000 words consisted of 7,288 letters, which is about equivalent to 1,458 words of 5 letters each, the average number for the English language. The above rate of transmission is therefore equal to 18 words of 5 letters per minute.

IMPROVED VISE.

The vise herewith illustrated is constructed with two vertical jaws, each provided near the upper end with a slot. A bar having hook teeth on its bottom edge is pivoted in the slot of the outer jaw, passing through the other slot, the teeth of the bar projecting toward the front. On the rear surface of the inner jaw is a slotted plate, on the bottom cross piece of which the hooked teeth of the bar catch. A bar which has its upper edge toothed and its lower edge beveled is pivoted to the lower end of the outer jaw and passes through a slot in the other jaw. The beveled edge rests upon a grooved roller in the slot. An arm is secured



ANDERSON'S IMPROVED VISE.

to the inner jaw, and to its upper end is pivoted a lever, which passes through a slot, on one side of which is a ratchet plate. Attached to the lever just in front of the pivot is an arm, to whose upper end is fastened a spring, and also a pawl engaging with the teeth on the upper edge of the lower bar. When the handle of the lever is moved downward, the pawl moves the lower bar and consequently the lower part of the front jaw forward, closing the jaws upon the work. The ratchet plate holds the lever at any elevation

This invention has been patented by Mr. William T. Anderson, of Rock Hill, S. C.