IMPROVED STUMP SAWING MACHINE.

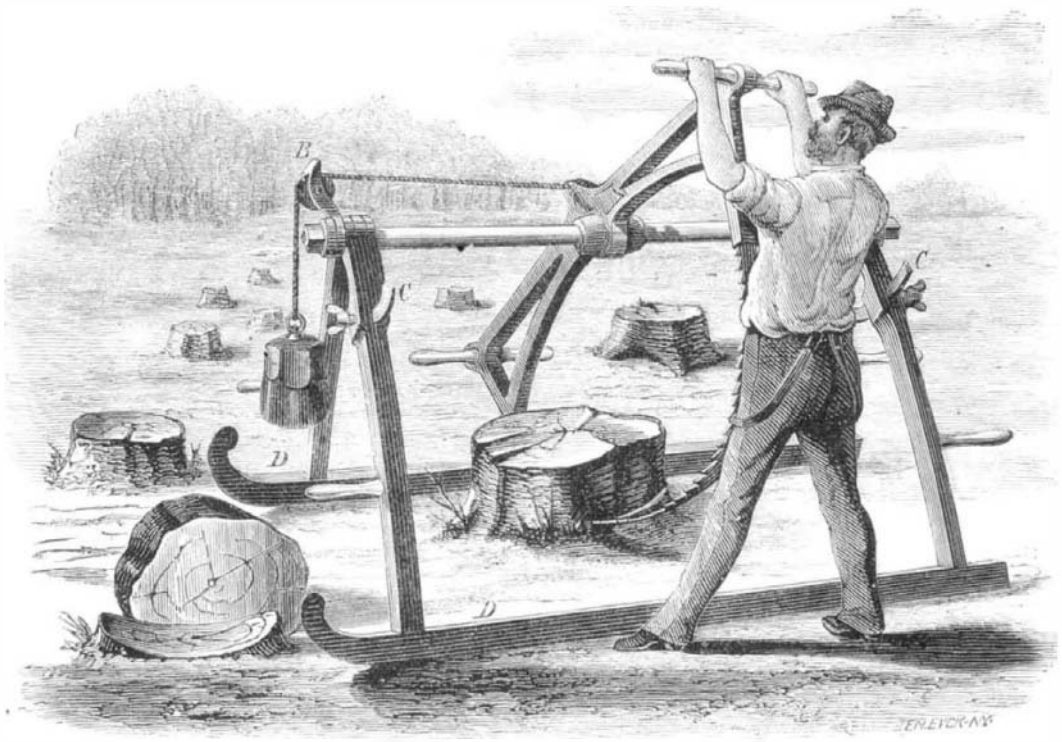
Settlers in wooded districts of the West, or farmers generally, who contemplate clearing off some of their timbered land during the present fall or in the spring of the coming year, will find in the annexed engraving a new saw represented, which will, without doubt, prove an efficient aid in accomplishing the labor of cutting off the stumps. The blade leaves the stumps with a concave top, which serves to retain moisture, so that the rotting of the lower wood is considerably facilitated, while the division may be made as deep as six or eight inches below the surface of the ground if it be desired.

An ordinary saw is employed, sprung in arc shape and clamped to the ends of a swinging frame, A, which is applied by a central sleeve to a smooth shaft, sustained in a supporting frame. The saw frame is provided at its ends with handles so as to be worked by one or two men. A cord attached to its center passes over a pulley, B, on the supporting frame, and carries a weight which produces the forward feeding of the saw into the stump.

The supporting frame consists simply of inclined legs pivoted to and secured by nuts on the ends of the horizontal shaft. The elevation of the latter above the ground and the consequent raising or lowering of the saw is provided by spreading the legs and fastening them in the required position by arc-shaped guides, C, and set screws. The lower ends of the legs are connected longitudinally by base runners, D, in order to gain increased stability to the frame, and to admit of steadier seating on the ground. Suitable handles on the legs serve to carry the machine from stump to stump.

The mode of arranging the apparatus, its size, and various other points of detail are plainly indicated in the engraving and require no further explanation. The inventor states that he has used the device with perfect success, cutting off the stumps below, even with, or above the ground with rapidity and ease.

Patented through the Scientific American Patent Agency, September 8, 1874, by Mr. James A. Elston, of Elston Station, Cole county, Mo., to whom letters for further information may be addressed.



ELSTON'S STUMP SAWING MACHINE.

Bronzes of Copper and Tin.---The Chinese Gong Metal.

Bronzes containing from 18 to 22 per cent of tin, heated to redness and suddenly cooled by plunging into cold water, have their density increased by the process; but when a specimen which has been so treated is again heated to redness and annealed, or very slowly cooled, the density is reduced. The latter effect is much less marked than the former and a piece of such bronze, subjected alternately to sudden and to slow cooling, has its density notably increased by a few repetitions of the operations. This result does not occur when a bronze containing only from 6 to 12 per cent of tin is submitted to the same series of processes. When alternately, either with annealing or with sudden cooling, the sample is submitted to such mechanical operations as simple compression, the stroke of a coining press, or, in the case of bronzes poor in tin, to extension in a rolling mill, the density of both classes of bronzes is augmented. Both the mechanical and heating actions contribute to this effect, which, in bronzes rich in tin, is more marked with sudden than with slow cooling. Bronzes rich in tin are softened by sudden cooling, while the reverse effect is produced in steel, in which also the density is diminished by the operation, instead of being increased, as in the bronzes.

A discovery of considerable industrial value is announced in Mr. Riche's paper. It is known that bronze containing about 20 per cent of tin cannot be wrought at ordinary temperatures, and that at a bright cherry red heat it crumbles under the hammer. The author has, however, found that at a dark red heat, or a little below it, this alloy is as malleable as iron, and may be hammered into thin plates with the greatest ease. Availing himself of this observation, he has been able, in conjunction with M. Champion, to fabricate gongs, which are, in chemical composition, external appearance, and sonorous properties, identical with the famous Chinese instruments.

Facts about Copper.

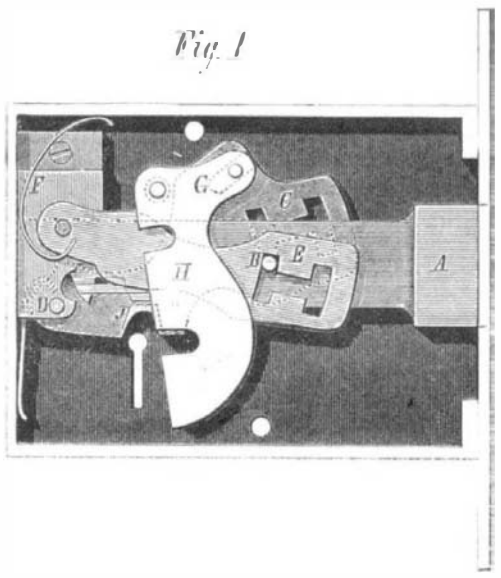
Mechanical actions, alternating with either slow or sudden cooling, produce in pure copper an increase of density when the heating has taken place without access of air, and a decrease in the contrary case. Brass has its density increased by sudden cooling and by mechanical actions, but diminished by annealing; while similor, which contains a much smaller proportion of zinc, undergoes no sensible change of density by these processes. Some experiments are described, proving the permeability to liquids of cast iron, by Mr. Riche, who finds that copper melted and run into the mold at a low temperature is also capable of absorbing liquids, a property acquired likewise by rolled copper after heating in charcoal. This property is not possessed by copper which has been cast at an elevated temperature, or heated with access of air, or alloyed with a small quantity of iron. The introduction of a small quantity of iron greatly increases the tenacity and hardness of copper, without interfering with its malleability.—*Journal of the Chemical Society.*

A Mine of Liquid Sulphur.

In the vicinity of San Martino, near Palermo, Sicily, a mine of liquid sulphur is being worked, or, in other words, large collections of the substance are being made at points where it flows from the fissures in the rocks in quantities of from 400 to 500 hundredweight per day. The sulphur comes from a burning mine within the mountain; and in order to give it time to cool, so as to admit of gathering it, the outlets are frequently closed for brief periods. Quite recently, on opening one of these closed fissures, it was found that the sulphur had disappeared; and in order to renew the flow, it was suggested to tunnel down toward the mine. Hardly was the work begun, however, before the pressure in rear of the obstructing mass became too great for the latter to withstand, and a terrific explosion ensued, hurling the workmen into the air, killing five and badly wounding six more.

MOAT'S IMPROVED LOCK.

The peculiar feature of the novel lock illustrated herewith is that no key, unless specially adapted to performing three distinct functions, namely, the throwing of a main tumbler and guard plates, the bolt, and the latch tumbler, can possibly open it. This will be more evident from the fact that the key holes are closed by guard plates before the motion of the other parts takes place, so that the introduction of implements for throwing the bolt and releasing the tumblers is at once prevented. The action of the key on the parts of the lock, in either direction, is the same, so that no intermeddling or tampering with the open lock is possible.



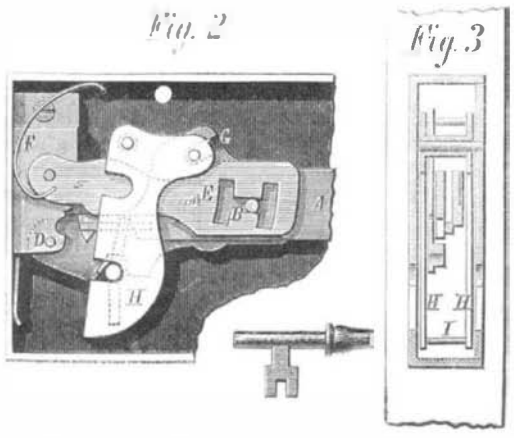


Fig. 1 shows the position of the working parts with the key hole open, and Fig. 2, the same with the guard before the latter. Fig. 3 is a vertical transverse section of Fig. 1. The form of the key is represented beside Fig. 2. A is the bolt, which is thrown by the key engaging in a recess at the rear part of the same. By means of pins, B, on each side, the bolt connects with the double T-headed slots shown in the main tumbler, C, which is pivoted at D and acted upon by the adjacent band spring, and in the latch tumbler, E, which is thrown by its separate spring, F. The tumblers, it will be observed, are thrown in opposite directions, so as to lock over the stop pins, B, of the bolt.

The main tumbler has, at G, a recess which embraces a pin of the double guard plates, H, which are pivoted above the bolt, and swing at both sides of the same, immediately under the outer side plates of the lock case. These plates are braced with lateral bars, I, Fig. 3, and have slots which enable them to pass over the stem of the key when the same is placed in the key hole. The turning of the key causes, first, a catching of the spurs over the part, J, Fig. 1, thereby carrying down the main tumbler, C, so as to release one of the stop pins, B, from the slots in said tumbler, and to throw the guard plates, H, around the key stem, thereby closing the key holes completely. The key next engages with the bolt recess (see dotted lines, Fig. 2), and raises also the latch tumbler, E, from the opposite stop pin, B, so that the bolt is free to be thrown for closing or opening the lock. The spring action on the main and latch tumbler carries them instantly, on the completion of the bolt movement, back over the stop pins, and throws the guide plates sidewise from the key holes, producing thereby the rigid and secure position of the bolt, besides the opening of the key holes for the key.

Patented through the Scientific American Patent Agency, August 25, 1874. For further information address the inventor, Mr. E. Moat, Watertown, Mass.

Elie de Beaumont.

The death of the oldest of French statesmen, M. Guizot, is closely followed by that of Elié de Beaumont, the greatest as well as one of the most aged of French geologists. M. de Beaumont was born in 1798; and after successfully conducting an extended series of metallurgical explorations under government auspices, he became in 1824 a mining engineer. From 1829 to 1833 he rapidly rose through the position of Professor in the School of Mines of the College of France, and finally became Engineer-in-Chief. At the death of Arago, M. de Beaumont succeeded that *savan* as perpetual secretary of the *Académie des Sciences*, and he was subsequently made a senator of the empire by Napoleon III.

M. de Beaumont's labors have resulted in the publication of several works, in one of which he endeavors to prove that mountain chains are to be classed according to the direction of their range, all those lying parallel with the same great circle of the earth, wherever they may be found, having been uplifted suddenly during the same geological epoch. The features of no fewer than ninety-five systems of mountains are accurately described in the last edition of this book. His geological researches in France have added largely to the knowledge of the resources of that country, as well as to general learning in the science. M. de Beaumont died on the 24th of September last.

Progress of Telegraphy in the United States.

The annual report of the Western Union Telegraph Company, just published, shows 175,135 miles of wire, and 71,585 miles of line in use, with 6,188 telegraph offices. The total receipts for the year were $9,262,653; expenses, $6,755,733. The Stearns Duplex telegraph apparatus, by which messages are sent both ways on one wire and at the same time, are in extensive operation.

But the past year has produced an invention still more wonderful than the duplex. Thomas A. Edison, and George B. Prescott, the electrician of the company, have discovered processes and invented apparatus by means of which two messages can be sent in the same direction, and two others in the opposite direction, simultaneously upon one and the same wire. This invention, which they have christened the quadruplex, is in successful operation between the New York and Boston offices, and is satisfactorily performing an amount of work upon one wire quite equal to the capacity of four wires worked with the ordinary Morse apparatus: so says the president.

A NEW device for registering the fares of street railroads has been introduced in Philadelphia. It is a portable receptacle for money or tickets, and resembles in size a large powder flask. The conductor presents the machine to the passenger, who puts in his fare in cash or a ticket, whereupon the conductor presses the spring, which works the register and sounds an alarm bell.

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