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Contents:

(Illustrations are indicated by an Asterisk.)

WATER AS FUEL.

There are before the community several schemes for employing water as fuel, and some of them are recommended by authorities which command the attention and respect of large numbers of persons.

It is well known that the burning of hydrogen produces a more intense heat than the burning of any other substance, and as hydrogen is one of the two elements which combine to form water, the idea has naturally occurred to many that if water could be cheaply decomposed, it would furnish an inexhaustable supply of the very best fuel. The cheapest mode yet discovered of decomposing water is by means of carbon. If water in the form of superheated steam is thrown upon charcoal or coke at a white heat—about 1,800°—the oxygen of the water combines with the carbon, forming either carbonic acid or carbonic oxide, and the hydrogen is set free in the form of gas. When the hydrogen thus set free is brought into contact with the atmosphere and set on fire, it burns, combining with the oxygen of the atmosphere, and again becoming water. One pound of hydrogen takes from the atmosphere eight pounds of oxygen to form nine pounds of water.

When the idea was first suggested of obtaining fuel by decomposing water, it immediately occurred to all who believe in the conservation of force, that the heat consumed in decomposing the water would be precisely equal to that produced by the re-combination of its elements, and investigations were commenced by several eminent chemists to ascertain by actual experiments whether this is the case. These experiments, conducted by different persons and by different methods, have fully established the law, that the heat absorbed or consumed in decomposing water is precisely the same as that which is produced by the burning of its hydrogen. All schemes, therefore, for obtaining an increase of heat by decomposing water belong to the class of delusions which are grouped under the name of "perpetual motion."

In actual practice, indeed, there is a considerable loss of heat. The water must first be heated to 212°, then about 1,000° are consumed in converting it into steam, and a further quantity of heat in raising it to the temperature at which it escapes into the chimney. All of this heat expended upon the water is simply thrown away.

Notwithstanding this inevitable loss, however, in the aggregate quantity of heat, there may be an advantage under certain circumstances in throwing a steam jet into a furnace. The fuel may be carried along so as to effect the combustion nearer the place where the heat is wanted, or the ashes may be blown from the coals and the combustion made more constant. As in the best steam engines nine-tenths of the heat is wasted, it is even conceivable that in some cases these advantages may more than counterbalance the loss in heating the water to the boiling point, in evaporating it, and in heating the steam to the temperature at which it escapes into the chimney. The necessity, however, of encountering this additional loss makes this one of the most unpromising of all conceivable plans for effecting an economy of fuel.

SPARE THE CENTERS.

The practice of knocking off the centers of turned work is a mischievous one. It is merely doing work that is not only needless, but that at some future day will have to be done over again. When a center is once properly made in a shaft, or any other part, it is unalterable except by chipping or purposely changing its position, and work once turned true on good centers will always be true, provided no damage occurs to it. It is just in this particular that the true center is useful, for if a shaft is bent or an arm on one thrown out of line, the old centers are available and the injured piece can be made as good as new in a short time. Suppose, however, that the journal of a shaft is worn oval, or that the collar is battered and jammed up, how is it possible to find the true center of the shaft? It never can be found; the shaft may be made to run straight but not by its old centers if they have once been cut off. When shafts are forged too long in cutting them to the right length great "tits" are left on the ends, which are both ungainly and in the way. This is the blacksmith's fault, and must be remedied by the machinist; cut the shaft to the right length first, knock off the centers if they are too long, and then re-center the job and finish it according to the drawing. In steam-engine work especially, the centers of shafts are essential to nice adjustment, and they should never be removed.

A foolish notion prevails among some mechanics that centers injure the finished appearance of the work, but it seems to us that this is an erroneous view which ought not to be tolerated. Drill every center, and drill it deep; counter-sink it so that it will have a good bearing on the centers of the lathe, and the workman will have the satisfaction of knowing that, all other things being equal, he will have a good job, and one that can at any time be easily repaired if damaged.

THE "DICTATOR."

On the 16th of August, 1862, we stated that Captain Ericsson had just signed a contract to build two iron-plated vessels on the *Monitor* pattern, designed to be the fastest and most formidable ships-of-war in the world. These vessels have been named the *Dictator* and the *Puritan*, and the progress of their construction has been noted from time to time in our columns. They are now both drawing rapidly to completion. The *Puritan* is still on the stocks at Greenpoint, but the *Dictator* is afloat alongside of the wharf at the foot of 13th Street, North River, with her machinery on board; and the carpenters are at work on her cabins and berths.

The *Dictator* is an iron ship, iron-plated, carrying one turret with two large guns. She is propelled by a screw driven by two engines, each having a cylinder 100 inches in diameter with 4 feet stroke. There are 56 furnaces which supply the power for driving the fabric through the water. There are 12 engines on board, 2 for propelling the ship, and 10 smaller ones for ventilating the vessel, turning the turret, and performing other subordinate offices.

The inner shell of the turret is now being dragged along the wharf from the house where it was built to its place on board the vessel. It is slid along on greased ways by means of an immense pulley-block, the rope being wound on a windlass by horse-power. The turret rests stationary on its ways till the rope is stretched to a certain tension, when it slips forward a foot or more at a step. This interior shell is formed of 4 plates, each one inch thick. When it is in place on the vessel it is to be surrounded from top to bottom by hoops, each 5 inches thick and 11 inches wide; these hoops being formed in quarter sections so that four pieces reach round the turret. These hoops are not pierced by bolt-holes, but are held in place by the outer shell of the turret which is 6 inches thick, built up of plates each 7-8ths of an inch in thickness. This outer shell is to be put together just above the turret, and then lowered into its place with the aid of hydraulic presses.

C. H. Delamater is the constructor of the *Dictator*, but several shops in different parts of the country have contributed work in their respective departments. The large forgings were all done at Bridgewater in Massachusetts. The most massive of these is the propeller shaft, which is 21 inches in diameter.

All of the materials used in the construction of this ship appear to be of the very best quality, and the workmanship is faultless in every respect. A thorough examination of the vessel impresses one with the conviction that she is an exceedingly staunch, swift and comfortable craft, and a most powerful instrument of destruction.

MUDSILLS.

Before the outbreak of the present war, when open hostilities were unknown, the grandees of the South could find no more bitter reproach for the mechanics of the North than the term "mudsills." Senseless as the appellative was to intelligent men, it served to show the estimation in which traitors held labor and those who live by it, and was expressive of their utter scorn.

A just retribution has fallen upon these traitors to their country, for through the want of those despised "mudsills" their railroads are in ruins, their factories, such as they have, short-handed, and only worked by "Northern men with Southern principles," and their steamers, for all offensive purposes, useless. Though the fields of the South at this moment require all the cultivation that can be bestowed upon them, there are none but slaves to plant the crops or to reap them if they were sown. The North is equally short-handed, but when men disappear from the homestead or the factory, dumb assistants supply their place, and the crops are not only gathered in cheaply, but are, or might be, increased in quantity by the employment of the useful agricultural machines which are now in market.

All other callings and trades are equally prosperous at the North, and only in the war-ridden South is the voice of labor hushed in the field, the hum of the factory replaced by solitude and ruin. The Southern journals, such as still exist, are full of demands for "mudsills;" they lament bitterly the loss of machine shops and foundries, and are inconsolable in being debarred the privileges of certain manufacturing towns which have recently been wrested from them in Georgia and Mississippi. It is, of course, the products of labor that they miss so greatly, but these products are the fruits of the skill and ingenuity of Northern "mudsills," whom they once derided, but now mourn and refuse to be comforted therefor.

Let them take this unction to their souls:—One day the Southern factories, mills and machine-shops shall be busy again; and a peaceful and smiling land acknowledge with gratitude the benefits which "mudsills" confer upon them.

COPPERING IRON SHIPS.

WE publish herewith some account of an English invention for coppering the bottoms of iron ships. The prospectus of the patentee (Mr. Warren) says:—

"The question of the day, in connection with iron ships is how to preserve them from fouling, and prevent galvanic action, where copper is used. Many expensive and troublesome plans have been adopted, but all are more or less failures. By order of the Lords Commissioners of the English Admiralty a vessel has been coppered at Portsmouth, England; she has been visited, while coppering, by officers of station and influence, engineers and ship-builders, by whom the plan has been reported on, in the most satisfactory manner. The price for a 'royalty,' including the cost of the materials for preparing the ship for the reception of the copper, is 1s. 6d. per superficial foot."

Appended is a description of the process:—

"The upper edge of the copper is secured with the ordinary coppering nails to a batten, which batten is secured to the side of the ship with screws; and above, or on the batten, a rubbing piece is worked, to prevent boats, &c., from injuring the upper copper. The sheets of copper are fastened together by Mr.