

## MISCELLANEOUS INVENTIONS.

Mr. Samuel Heaton, of Cedar Rapids, Iowa, has patented an improved fence post. The object of the invention is to improve the construction of fences, more especially those made of vertical iron posts carrying longitudinally stretched iron wire, and the invention relates more particularly to a fence post stiffened at its lower portion by a triangular rod brace, the base and greater portion of which is below the upper surface of the ground. In the present improvement the upper extremities of the triangular brace are curved or bent outward over a link or loop which takes against both sides of the post and holds the bent ends of the brace firmly against the edges of the post. A locking link passing through a slot in the post, and secured by a key on one side of the latter, also serves to hold the base portion of the brace to the other side of the post. This construction makes a very strong and efficient fence post.

Mr. Henry Cutler, of North Wilbraham, Mass., has patented an improved steam grain drier. This invention relates to steam grain driers in which the grain is introduced at the upper end of a rotating inclined cylinder, heated internally by steam tubes, and is discharged at or near the lower end of the cylinder. In a drier constructed according to the invention the grain, in its travel through the cylinder, passes over and around the drying pipes in a downward spiral direction. The apparatus embraces various novel details which augment its convenience and efficiency, the same including a spider at the upper end of the cylinder with curved arms and a conical flange to receive the grain and holes for the steam pipes, a cylinder casing provided with ventilating apertures protected from escape of the grain therethrough, buckets on the exterior of the casing for directing the discharge of the grain, additional drying pipes within the cylinder, and improved means for introducing the steam and carrying off the water of condensation.

Mr. George W. Blake, of Port Townsend, W. T., has patented an improved harness for use in working or in breaking a horse, and also in driving vicious horses, the object being to permit freedom to the animal in walking or trotting and prevent kicking and running. The invention comprises a breast strap, hump straps buckled to the breast strap and passing around the hind legs, and a series of straps supporting the two former straps, the whole forming a harness for breaking and controlling the horse. Combined with this controlling harness is a breeching strap passing around the butt, and safety reins provided with a nose strap and controlled by an elastic strap. This safety harness binds the animal in a harmless manner, without checking his freedom, and is a very efficient contrivance for the purposes it is designed.

Mr. Ogden H. Tappan, of Potsdam, N. Y., has patented an improved hand stamp for post-office use. The invention consists of a hand stamp carrying two parallel rolls, one to postmark, the other to cancel, and both receiving their supply of ink from the same superimposed reservoir in the handle and the same intermediate feed. By slightly tilting the stamp in reverse directions either roll is brought to bear upon the letter as required. This forms a cheap and effective stamp, and one which can be used rapidly and on all kinds of mail matter.

A new composition of matter, for the production of artificial stone, has been patented by Messrs. Carl Grünzweig and Paul Hartmann, of Ludwigshafen-on-the-Rhine, Germany. The materials used in the production of this stone are pulverized cork, clay, sand, and cement, hydrate of lime, soluble glass, hair, and water in certain proportions, the same forming a stone which is light but strong, and especially adapted for partitions in upper stories which are not supported by a lower partition. Such artificial stone is free from dampness and not liable to speedy decay.

Mr. William H. Hall, of New York city, has patented a cheap and serviceable waterproof cap. The invention consists of a cap composed of a waterproof body, which may be made of linen or other suitable material, blocked into shape, and coated with a shellac solution, a lining of silk or other material firmly united to said body, a loose cover secured to the lower portion of the body, and a peak or front. With this construction, should the cover shrink or stretch from being wet, the stiff waterproof body will keep it in place and cause it to return to its proper shape when dry.

An improved key ring, capable of being easily opened and securely closed, has been patented by Messrs. Bryant H. Melendy and William J. Boynton, of Battle Creek, Mich. The invention consists of a flat ring divided transversely so as to present meeting ends, preferably of an irregular form, and the one end portion of which has a notch in its outer edge, while the other end portion of the ring is provided with a pivoted clasp, in which is a cross piece that engages with the notch. Said clasp also has an indentation into which a projection on the notched end portion of the ring snaps when the clasp is closed. The outer edge of the clasp is flush with the outer edge of the ring, accordingly it has no projections to tear and rip the pockets.

Mr. Frank J. Gould, of Sidney, Ohio, has patented a magazine stove, which has many advantages over or as compared with magazine stoves as ordinarily constructed. The magazine of the stove has a vertical row of perforations which connect with a tube closed at its top but open at its bottom, and connected with the outside air by means of a lower branch pipe, whereby the gases from the coal within the magazine are inexpensively consumed in the stove. A chamber for the heat products of combustion is formed above the magazine, which is disconnected from the shell of

the stove, thereby exposing all parts of the latter to the fire, communication with the upper chamber being formed by a reduction in an overhanging collar at the top of the magazine, which is some distance from the top of the stove. Furthermore, said magazine is independently supported within the shell, thereby admitting of its separate removal.

An improved hair tonic, which, applied as a wash to the head, avoids the formation of dandruff and strengthens and invigorates the hair, has been patented by Mrs. Caroline Weisser, of Los Angeles, Cal. The preparation consists of a decoction of dried olive leaves, marjoram leaves, marjoram roots, and of glycerine in certain proportions.

## STEAM BOILER NOTES.

At midnight, November 10, a steam rectifying column in Gaff's distillery, in Aurora, Ind., exploded from overpressure of steam, with such terrific force as to shake the town. The inflammable vapor that arose from the liquor took fire from a burning gaslight, and about one hundred feet of the building was burned. William Fowler, a warehouseman, sleeping in the building, was killed, and his remains were found among the ashes on the following morning. The loss is variously estimated at from \$25,000 to \$40,000. Insurance, \$14,200.

Ten boilers in the extensive lumber and salt manufactory of Hamilton, McClure & Co., six miles below East Saginaw, Mich., exploded about 5 A.M., November 13, wrecking property to the extent of \$25,000, and killing four firemen, Michael and Joseph Lehan, Frank Blanchard, and Charles Carpenter. The brick boiler house and brick chimneys were leveled with the ground, and the mill and salt block badly damaged. The debris was scattered in every direction, pieces coming down half a mile distant.

Low water, as usual, is said to have been the cause of the above explosion. It is to be hoped that competent boiler inspectors will find their way to the scene of this disaster in time to make an exhaustive examination; because the phenomena, as related by non-professionals, are such as usually attend the sudden liberation and expansion of a large volume of highly heated water, rather than such as arise from the collapse of an overheated internal flue, or the escape of steam from an overheated externally fired boiler shell in which there was little or no water.

The tugboat Lehigh, owned by William J. Wilson, of Albany, exploded its boiler November 14, between the main land and Starin's Glen Island, Long Island Sound, and one man was killed. The tug was engaged on the work of towing out of the harbor scows filled with mud and rocks taken from the work being done there by the government in deepening New Rochelle Harbor. There are two dredges at work in the harbor, one, the Niagara, belonging to Contractor Seward, and the other, the Kinderhook, belonging to E. M. Paine, of Albany. Mr. Seward had chartered the tug Lehigh to tow the scows out into deep water and dump them. This was generally done off Huckleberry Island, some distance down the Sound. Hugh Chard, of West Troy, N. Y., is the captain of the tug, and Warren C. Norris, of Albany, engineer. At about 12:30 P.M., the tug was lying at anchor alongside of a water boat, owned by Mr. Paine, some 600 feet from the shore and dredges. At this hour James Tillotson, the cook, was the only person on the tug. All at once there was a deafening report, and the spot where the tug had been was enveloped in steam and flying timbers. When the steam cleared away the tug had disappeared, not a vestige of it remaining, and the side and deck of the water boat, to which it had been attached, were torn to splinters. Tillotson's lifeless body was soon after taken from the water, it having been blown at least 150 feet from the tug by the force of the explosion. A large piece of the boiler was blown to Mr. Emmett's place on the mainland, some 700 feet distant. An ax and adz, which had been on the tug, were found on Hunter's Island. The boiler of the tug was inspected about a month before the explosion by Charles Harvey, a local inspector at Albany, and passed as all right and safe to carry at least 75 pounds of steam. The tug was overhauled and repaired about a year ago, and the boiler, then an old one, was put in. She was valued at \$3,500.

The engineer said before leaving New Rochelle that, when he and the captain went off the tug to go fishing, he, as a precautionary measure, opened the furnace door under the boiler, and otherwise so attended to it as to be assured of its safety. He was positive that there was not over 60 pounds of steam in the boiler when he went away, and he could not explain why it exploded. It was learned in New Rochelle that some part of the boiler gave way a short time before the 14th, and it had to be patched up. The cause of this explosion seems to be "engineer went a-fishing," left steam up and fire burning, with, probably, an inefficient safety valve.

## Electrical Steel Melting.

On Tuesday, October 11, the members of the Iron and Steel Institute visited the telegraph construction works of Messrs. Siemens Brothers, at Charlton, on which occasion Dr. Siemens, F.R.S., exhibited his experiment of melting steel by means of the dynamo-electric current, when five pounds of steel were melted in five-and-twenty minutes. The apparatus employed consists of an ordinary crucible of plumbago, or other highly refractory material, placed in a metallic jacket, or outer casing, the intervening space being filled up with pounded charcoal, or other bad conductor of heat. A hole is pierced through the bottom of a crucible

for the admission of a rod of iron platinum or dense carbon, and the cover of the crucible is pierced for the reception of the negative electrode, which is suspended at one end of a beam by means of a strip of copper. The other end of the beam is attached to a hollow cylinder of soft iron, free to move vertically within a wire solenoid, one end of which is connected with the positive and the other with the negative pole of the electrical arc.

Obviously it matters not how the electricity used in this experiment may have been generated. Any source of power might be employed for driving the dynamo machines. In other words, steel may be melted by water power.

## Note on the Estimation of Copper in the State of Subsulphuret.

BY ANTONY GUYARD (HUGO TAMM).

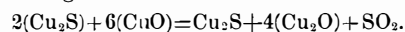
In the French edition of Fresenius's analytical chemistry ("Traité d'Analyse Quantitative," Paris, 1875, page 281) Fresenius describes the method of estimating copper by calculation of its sulphuret in a stream of hydrogen gas at a red heat and obtention of this metal in the state of  $\text{Cu}_2\text{S}$ , and he adds the curious following statement, formed partly of a quotation from Ulrici and partly of his own remark. I translate it here literally: "If instead of calcining the precipitate of sulphuret of copper in a stream of hydrogen it were heated to redness in a closed crucible, that the crucible be abstracted from the fire from time to time and opened during a few seconds, the compound,  $\text{Cu}_2\text{S}, \text{CuO}$ , more or less mixed with oxide or sulphuret of copper, would be obtained. But since  $\text{Cu}_2\text{S}$  and  $\text{CuO}$  contain the same percentage of copper the amount of copper may be calculated from the above residuum (Ulrici). So presented, the method is more simple; however, the results obtained are not so exact." (The latter words in Italics are Fresenius's own.)

On principle Ulrici is perfectly correct, and, on the other hand, whoever has consulted Fresenius's works knows what reliance can be placed in the statements of this eminent analyst.

However, the contradiction apparent in the above paragraph attracted the attention of the writer, who investigated the matter, and found that, as is so frequently the case, the phenomenon is more complicated than was supposed, and consequently not in accordance with theory which was simple.

When subsulphuret of copper is calcined with access of air in the conditions adopted in analysis, it is not the mixture,  $\text{Cu}_2\text{S}, \text{CuO}$ , which is obtained, but, on the contrary, the mixture  $\text{Cu}_2\text{S}, \text{Cu}_2\text{O}$ . This is readily proved by treating the residuum with hydrochloric acid. It is then found that a large proportion of  $\text{Cu}_2\text{Cl}$  is formed, the white subchloride of copper, which becomes insoluble when its solution is treated with an excess of water.  $\text{Cu}_2\text{S}$  being insoluble in hydrochloric acid, the subchloride obtained can only be formed by the suboxide,  $\text{Cu}_2\text{O}$ , existing in the mixture.

The theory of the formation of a mixture,  $\text{Cu}_2\text{S}, \text{Cu}_2\text{O}$ , is easily found in a fact overlooked by Ulrici, and which is probably exposed here for the first time, that when  $\text{CuO}$  is heated in presence of  $\text{Cu}_2\text{S}$  it reacts upon it with formation of sulphurous acid and suboxide of copper, as is indicated by the following formula:



When  $\text{Cu}_2\text{S}$  is heated in the air for a sufficient time, besides  $\text{Cu}_2\text{S}$  and  $\text{Cu}_2\text{O}$  found in the proportion indicated in the above formula, a little  $\text{CuO}$  is also detected, showing that this oxide is really formed during calcination, but is constantly destroyed by the existing subsulphuret.

## Charles Benedict.

Hon. Charles Benedict, of Waterbury, Conn., died of heart disease on October 30, on board the steam-ship Wisconsin, on his way from England. Mr. Benedict had gone abroad for business and pleasure, and had been on the Continent about six weeks. He was apparently in good health when the Wisconsin left Liverpool. On Sunday, after divine service on shipboard, he complained of a pain in the left side. Surgeon Fottrell prescribed for him, and he went to his cabin. At 11:30 the surgeon found him dying. He expired in a few moments. Mr. Benedict was closely identified with all the large manufacturing interests of the Naugatuck Valley, being of the firm of Benedict & Burnham, of New York and Waterbury. He was president of the Waterbury Watch Company, Waterbury Clock Company, Waterbury Pin Company, and president of the Mitchell & Vance Company, dealers in gas fixtures, of New York. Mr. Benedict was at the time of his death sixty-two years of age. His father, Aaron Benedict, founded the firm of Benedict & Burnham, at 13 Murray street, in 1812. On the death of his father Charles Benedict assumed control, and had been actively concerned in its management for twenty years. He was well known in Connecticut, and had great influence in the State, though he never entered to any extent the field of politics. He was mayor of Waterbury in 1860, a man of liberal ways, public spirited, and widely esteemed.

## John L. Hobbs.

John L. Hobbs, one of the oldest glass manufacturers in the United States, and discoverer of the use of lime in the manufacture of glass, died in Philadelphia, November 1. He was a member of the firm of Hobbs, Brockunier & Co., but was not actively engaged in the business. He had been identified with Wheeling industries since 1844, and was born at Fort Moultrie, S. C., in 1814.