

a second, about sixty miles an hour or one mile in a minute. When we move from the sounding body with this velocity, the opposite will take place; one twelfth of the vibrations will reach our ear and the tone will appear flattened a semi-tone. When the sounding body moves and we are at rest the effect will be the same, as is self-evident.

When two railroad trains are passing one another and one locomotive sounds the whistle, the passengers in the other train will hear a higher note, when the trains are approaching, due to the combined effect of the two motions. When each train is moving at a velocity of sixty miles an hour, the rise of pitch will be a whole tone above the real note. When the trains have passed and the distance intervening is increasing at the same velocity, they will then hear the sound a whole tone below the true one. Hence, at the moment of passing a change of pitch will be observed of two whole tones or a major third. Both trains, however, seldom reach this velocity, and the change of pitch usually observed will seldom be more than a minor third, or one tone and a half, which corresponds to a mean velocity of each train of one fifth less than sixty, or forty-eight miles an hour. The same fact is observed in the sound of the locomotive bell when it is rung in passing.

When traveling at night I have often amused myself in noticing the correct interval of this change in pitch; deducing from it the sum of the velocities of the two passing trains. Then, by knowing the size of the drive wheels of the locomotive of my train, and taking into consideration that four puffs of steam correspond always with one revolution, and timing the velocities of these steam puffs, I had the key to the velocity of my train; and subtracting this from the total velocity obtained the velocity of the train which had passed, and of which nothing but the changing pitch of the whistle had been observed.

P. H. VANDER WEYDE, M. D.

New York City.

Explosive Gases in Steam-Boilers.

MESSRS. EDITORS:—The explanation of the highly interesting case, mentioned by a "Practical Engineer," page 35, is evident. When the supply proper refused to give water, there was, of course, a lack of water in the boiler; and, notwithstanding that the engineer withdrew his fires, some part of the boiler became hot enough to decompose the steam, not into its elements (this is a pure speculation, having no fact to support it), but the iron became oxidized by the oxygen of the water, and the hydrogen was set free, which is always the case when steam is in contact with red hot iron. It is, in fact, one of the ways to manufacture hydrogen. The boiler being closed, and the hydrogen not soluble in water, it remained there; and when, after cooling, the man-hole was opened, air enough entered to form with the hydrogen an explosive mixture, to which the engineer set fire with his lamp. Any practical chemist, acquainted with the enormous explosive power of oxygen and hydrogen, mechanically mixed in such proportion as they are chemically combined in water, will agree that, if such a mixture had been in the boiler, something much worse would have happened to the engineer and to the boiler also. In this case it was simply hydrogen and common air, which may be considered almost harmless, when compared with the tremendous power of hydrogen and oxygen.

P. H. VANDER WEYDE, M. D.

New York City.

The Use of Ozone in Sugar Refining.

MESSRS. EDITORS:—In your journal of June 23d and August 5th, I notice two articles on the use of ozone as a decolorizing agent in a sugar refinery. Having visited that refinery about six weeks since while in London, I thought that the following facts might be of interest to you.

The first experiments in bleaching sugar by ozone were made in the country, about sixty miles from London, and were a perfect success, changing a dark brown solution of sugar to a straw color in a few minutes, and at the same time depositing all the foreign substances. The result of these experiments being so satisfactory, the owner of a sugar refinery in White Chapel was induced to put up a steam engine to drive an electric machine and bleach sugar by these means; but it has proved a total failure on account of his inability to produce ozone in any quantity. The owner of the refinery attributes this to the air of London being, to a great extent, deprived of that gas by its immense population. Be that as it may, until somebody discovers a means of obtaining that gas in large quantities at a moderate price, sugar refining by ozone will remain in its present condition.

H. W. B.

Philadelphia, Pa.

Useful Hints for the Season by Septimus Plessee.

REMEDY FOR INSECT BITES.—When a musketo, flea, gnat, or other noxious insect punctures the human skin, it deposits or injects an atom of an acidulous fluid of a poisonous nature. This causes an irritation, a sensation of tickling, itching, or of pain. The tickling of flies we are comparatively indifferent about; but the itch produced by a flea or gnat, or other noxious insect, disturbs our serenity, and, like the pain of a wasp or bee sting, excites us to a "remedy." The best remedies for the sting of insects are those which will instantly neutralize this acidulous poison deposited in the skin. These are either ammonia or borax. The alkaline reaction of borax is scarcely yet sufficiently appreciated. However, a time will come when its good qualities will be known and more universally valued than ammonia, or, as it is commonly termed, "hartshorn." Borax is a salt of that innocent nature that it may be kept in every household; it can be recommended as a domestic and harmless chemical. The solution of borax for insect bites is made thus:—Dissolve one ounce of borax in one

pint of water that has been boiled and allowed to cool. Instead of plain water, distilled rose water, elder, or orange flower water is more pleasant. The bites are to be dabbed with the solution so long as there is any irritation. For bees' or wasps' stings the borax solution may be made of twice the above strength.

WATER COOLERS.—We all know that cold water during the summer is one of the greatest luxuries. When it is generally understood that evaporation produces cold, it will be evident that any vessel or material that favors evaporation will induce this result. Now, all porous and absorbent vessels are of this character. Pottery not glazed is porous. A linen cloth dipped into water is porous, absorbs water, and when exposed to the air the water evaporates, producing cold; hence, if any vessel be covered with a damp cloth, the interior will be colder than the exterior. A water cooler is a porous vessel, which allows evaporation to take place on its outer surface, thus cooling the contents. The water coolers, as sent to us from Staffordshire, have, however, one fault; they are not sufficiently porous; hence there is only a very slow infiltration from the inner to the outer surface, and any minute organic substance that may be in the water is arrested by the crock. After a time, this organic matter, it is often observed, undergoes decomposition, giving a musty, earthy odor to the water that may be in the vessel. When this is the case, it should be cleaned both inside and out, with an ounce or two of strong muriatic acid, rubbing the exterior with a flannel wet with the acid, followed with clean hot water. After this treatment the vessel will be, as before, a good water cooler.

LEMON KALI.—A teaspoonful of this compound in a tumblerful of fresh cold water, forms a very agreeable effervescent summer drink. When made, it must be preserved in a dry place, and in well-corked bottles, otherwise it will soon be spoiled. To make it, take one pound of powdered white sugar, half a pound of bicarbonate of soda, half a pound of citric acid, powdered, and half a gram of essence of lemon. Sift the whole well together, then put it into dry, wide-mouthed bottles. Tartaric acid may be used instead of the citric acid at less expense, but it is not so good for general use. Citric acid is the true acid of the lemon; tartaric acid is derived from grape lees, tamarinds and other fruit. The pleasing flavor of lemon kali depends much upon the quality of the essence of lemon, which rapidly spoils in druggists' shops, and smells like turpentine. See that you have good and fresh essence of lemon.

FLEAS IN DOGS.—Fleas trouble dogs, and one of the best remedies is the following: Rub colza or common olive oil into the coat, saturate the hair with the oil to the surface of the skin, let it remain on for half an hour, then well-wash out the oil with the best yellow soap and lukewarm water. A small portion of any sweet oil brushed into the coat of a woolly dog, will prevent its being infected with vermin. Matrons of large schools may advisedly take this hint. Insects of every kind have a "life and death" dislike to grease in any form.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

An iron steamer, the first ever built there, was launched at Cleveland, Ohio, on Saturday, 25th ult.

It has been suggested in England to unite Scotland and Ireland by a tunnel. The distance of the proposed tunnel is about fourteen and a half miles, and the cost is set down at \$3,150,000.

Sun-dried oysters, cured like beef by hanging in the sun, are becoming an important article of traffic in California.

Ninety locomotives are now in use on the Union Pacific Railroad, and a hundred and seven others have been ordered.

An Imperial French decree suspends the tonnage on vessels entering the ports of the Empire with breadstuffs for three months from the 1st of October next. This would seem to imply a short harvest in France.

DISCOVERY OF CHLORIDE OF POTASSIUM.—A vast deposit of pure chloride of potassium has been discovered in a salt mine in Hungary. This must prove of great commercial value to Austria.

APPROPRIATIONS FOR IMPROVEMENTS.—Congress appropriated a million and a half dollars for river and harbor improvements at the late session. Three hundred and fifty thousand dollars go for the improvement of the Mississippi.

NEW OCEAN STEAM ROUTE.—A contract was concluded, a short time back, by the Chilean Government with the Pacific Steam Navigation for direct mail communication with England. The voyage out and back must be completed in forty-two days. The first ship sailed on the 13th of July.

SUGAR IN BREWING.—The use of sugar in British breweries has largely increased. During the year 1867, 41,143,000 pounds were consumed. Narcotic adulterations of an exceedingly deleterious nature are often added to the liquor.

A NEW PHASE IN ECONOMY.—A species of co-operation system has been adopted by the Pennsylvania Railroad Company. It is agreed to divide among the engineers and firemen all that they save from last year's expenditure of fuel, oil, and other articles in running their locomotives.

PEAT AS FUEL FOR LOCOMOTIVES.—Mr. F. Trevetick, has been making experiments in Canada on the engines of the Grand Trunk Railroad. He seems to have arrived at the conclusion that a ton of peat (3,240 pounds) is equivalent to a ton of the best wood.

LARGE SALT MINE.—Near Berlin, Prussia, an enormous salt mine has been discovered. The thickness of the bed is a hundred feet, and its extent has not yet been determined.

HOW A STRIKE WAS CONQUERED.—A shoe manufacturer in North Adams, Massachusetts, has conquered a strike in his factory and is now running it with a full force of workmen. He secured forty-three men in Montreal, and now employs none who belong to a "Union."

NEW PUBLICATIONS.

HAPPY HOURS: A Collection of Songs for Schools, Academies, and the Home Circle. By Edward Kingsbury and Alfred A. Grady. New York: Taintor Bros., No 698 Broadway.

A collection of music suitable for children, interspersed with pieces requiring some skill and culture in their execution. The words and the music seen equally chaste and carefully arranged. Both are of a high order. The collection is a good one, and will meet with great favor with teachers, pupils, and families.

Recent American and Foreign Patents.

These lists containing the names of the inventors, the titles of their inventions, and the names of the patentees, are published weekly in the Scientific American.

MILL FOR GRINDING CLAY.—Levi Moore, Baraboo, Wis.—The object of this invention is to provide a mill for reducing clay to a pulverulent and plastic state, suitable for building brick or pottery. It consists of the form and arrangement of the grinding devices, the whole being contained within a frame adapted to their operation.

FENCE.—Henry J. Culp, Goshen, Ind.—This invention relates to an improvement in fences, and consists in so constructing the panels of which the fence is composed that they can be readily connected and disconnected.

SICKLE BAR FOR MOWING MACHINES.—G. W. Chapman, Jr., Iowa Falls, Iowa.—This invention relates to an improvement in the construction of sickle bars for mowers and reapers, and consists in forming the bars in two pieces, in such manner as to secure separate cutters or teeth between them, so that the teeth may be easily removed when necessary to sharpen or repair them, or replace any when broken.

LOG SLED.—Chas. W. Mosher, East Leon, N. Y.—The object of this invention is to provide a log sled or boat with means to enable the logs to be taken on to the sled through the draft force exerted by the cattle hitched thereto. It consists of an angular or arched frame vibrating over runways, which latter have bearings on the sides or runners of the sled, or in suitable pieces of timber affixed thereto, together with a chain and log hooks so arranged that the draft force of the team will act to raise the log and draw it forward upon the sled.

PORTABLE CLOTHES RACK.—Geo. H. Hammond, Dayton, N. Y.—The object of this invention is to provide a simple, durable, and portable rack for drying clothes. It consists of a central staff having two hubs affixed thereon, the said hubs being formed with jaws in which are provided folding arms and a jointed brace for holding the arms rigidly extended; the drying ropes are arranged at proper intervals on the arms, and the whole toset upon a post and revolve freely thereon.

BELT TOOL.—Eben Hester, Saffield, Conn.—The object of this invention is to furnish a convenient tool for fitting belts for machinery. It consists of a square shank set in a handle and bearing two punches for cutting holes in the belt, and two punches having hollow or concave points for heading rivets. It is also provided with a flat lacing awl having an eye for carrying the leather lacing strip.

COUPLING FOR SICKLE PITMANS.—O. P. Drury, Niles, Mich.—The object of this invention is to provide a strong, durable, and easily working coupling device for connecting the pitmans of a reaping or mowing machine with the sickle rack of the same.

LAMP.—S. C. Brockington Groton, Conn.—The object of this invention is to construct a lamp for kerosene and other hydrocarbon liquids, in which the wick will always be equally far inserted in the liquid, so that thereby a steady and equal flame will always be obtained. The object of the invention is also to provide an oil reservoir and connections by means of which any number of lamps can be supplied with the necessary fuel.

WRITING AND DRAWING DESK.—Wm. W. Levering, New York City.—This invention relates to a new desk, which is provided with slates, blackboards, and transparent ground glass plates, in such manner that they will be convenient for teachers, artists, and business men.

FLY FRAME FLYER.—James S. Streeter, Providence, R. I.—This invention relates to a new and improved method of constructing flyers for the twisting of yarn, whereby the same are more economically made, and whereby the roving is more effectually prevented from flying out when running.

RICE CULTIVATOR.—Geo. W. Cooper, Ogechee, Ga.—This invention relates to a new rice cultivator, by which the ground between the drills is broken up, without throwing clods upon the plants, and without forming furrows and hills between the drills.

SASHES AND WINDOW FRAMES.—Johann Schnell, New York City.—This invention relates to a new manner of constructing window frames, with a view of facilitating the cleaning of the glass panes, the replacing of broken panes, and the repairing of broken sash cords. The invention consists in hanging the frame in which the sashes move up and down to the casing of the windows, so that it can be folded or turned like a folding window, and still be provided with sliding sashes.

EXTENSION WARDROBE FRAME.—Ellas Gill, New York City.—The object of this invention is to construct a frame for a portable wardrobe, in such manner that the same may be freely and readily extended and contracted as to length and width, according to the room which it is intended it should occupy. The invention consists in connecting the four posts of the frame, which fit with their lower ends into slotted bars or beds, longitudinally as well as transversely, with toggle levers or slotted extension levers, or both, so that they can, longitudinally as well as transversely, be moved any desired distance apart.

ELASTIC SUPPORTS FOR CAR SEAT BACKS.—Geo. Higginson, Newark, N. J.—This invention relates to a new device for supporting the arms of car seat backs and for receiving the shock when the same are reversed. The invention consists in the use of bolts or blocks which are resting upon springs or other cushions, and which are secured to the sides of the seat, so that the arms, to which the back is secured, may rest upon the upper ends of these elastic supports, and may, if the back, is reversed and suddenly let fall, find a yielding support.

GRATE FOR STOVES AND FURNACES.—A. J. Magoon, Providence, R. I.—This invention relates to a new grate for stoves, ranges, and furnaces, which is so arranged that it can at the same time serve as a grate and ash sifter. The grate is of circular form, and is at its center, by a vertical pin, pivoted in a horizontal shaft. On one side the grate is supported by a fixed lug, so that it cannot be dumped to that side. If by suitable gearing connection the grate is revolved around its vertical axis in one direction, it will simply obtain the said motion and will cause the coal held on it to be thoroughly shoveled and sifted, but if revolved in the opposite direction, it will not be held by the lug and will swing around the horizontal axle and be dumped.

ICE PITCHER.—Thomas Leach, Taunton, Mass.—In this invention a detachable and removable lining, of glass, china, or earthen ware, is employed, and in connection with it a combined valve and filter of peculiar construction, together with a novel and convenient device for holding the lining firmly in the pitcher and at the same time preventing it from fracture by the sliding of the ice.

MACHINE FOR DISINTEGRATING CEMENTED GRAVEL.—J. B. Cox, San Francisco, Cal.—This invention relates to an improved machine by means of which the compact gravel that abounds in and about the gold mines of California and elsewhere can be readily disintegrated, so that the gold which it contains may be separated from it.

POCKET COUNTER.—Jacob S. Detrick, San Francisco, Cal.—The object of this invention is to provide a neat and convenient pocket instrument by which the velocity of shafting, etc., can be accurately determined.

MANUFACTURE OF BROOMS.—Robert F. Dobson, Goderich, Canada.—This invention relates to an improvement in the mode of securing the broom proper, or the corn to its handle, and it consists, first, in so fastening the broom corn that the free portion shall extend toward the upper end of the handle and then bending or turning the said corn back upon itself and there securing it.

PORTABLE FENCE.—Joseph W. Norman, Eugene, Ind.—In this invention the posts are connected together by links, and each panel is so attached to its supporting posts that it can readily be detached and folded or rolled up, forming a compact and easily portable roll. The form of the posts is also new.

SCREWDRIVER.—W. S. Goss, Baltimore, Md.—In this invention the handle is made of three pieces connected by clutches and stops in such a manner that its lower part can be turned continuously in either direction without releasing the hand from the upper part. In addition to this improvement, the blade is provided with an adjustable tool holder, which can be employed for holding gimlets, augers, awls, etc., while inserting them into or removing them from the wood.