find extensive sale hereabouts. The knives are gotten up in various shapes of ferocity, some of them similar to those seen in the hands of the lowering gentlemen who attitudinize in the *New York Weekly* and the novels of the sanguinary marine school. The machetes are quite different from our cane-knives, being as long as swords, and resembling them, but broader at the end. Of these the Collins Company has manufactured more than three hundred patterns, and they are made from the very best of steel. Here is another tool which not even the sharpest Yankee could guess the use of. It has a handle like that of a knife, and the blade is eighteen inches long, and eight or ten inches broad in its broadest part, toward the end, and an eighth of an inch thick, ground to an edge, and polished all over. What is it? A weapon for defence or offence, you would say; possibly a heavy pruning knife, or a light butcher's cleaver. Wrong again. This is a Brazilian hoe! The rural operator squats down by a hill of corn, holds the handle in the right hand near the ground as a pivot, and grasps the end of the blade with his left hand and moves it mildly around toward the roots, poking the soil up to the little hillock! Perhaps this seems very primitive to us, but it is quite certain that our method seems as foolish to our brethren of the south, for when a Yankee went down with a cargo of our hoes, they refused to tolerate the "awkward things," but forged them into hoes of their own fashion Of these tools—mainly of the cane machetes—the Collins Company manufacture sometimes more than 200,000 a year.

During the last decade the Collins Company have "taken hold of the plow," and have brought it to a high degree of perfection. They make it of cast steel—the only one of the kind in the world. The plow is one of the oldest of imple ments fashioned by the human hand. We can scarcely be certain that Cain had a plow of his own when—a young man of a hundred and fifty—he farmed it on a small scale and without great success in the suburbs of the city of Enoch, "to the eastward of Eden;" but even Adam might have lived to see one, for he exhausted the best part of a thousand years, and doubtless be held the sparks fly from the anvil of Tubal Cain, his blacksmith descendant of the eighth generation. And if they had iron, is it not probable that they made some sort of rude plow?

The first plow of which we have any description is figured roughly on the monuments of Egypt. It seems to have been a mere wedge, with a short beam and a crooked handle. But Moses and Samuel speak of the plow, and even at that early day it possessed both a coulter and a share, as we learn from their similes. The plow of the Israelites, like the modern plow, was drawn by a yoke of oxen, and it was forbidden by law to yoke an ox and an ass together. The early Greek plow had a wheel. Most of the old rustic authors referred to the plow; Virgil wrote of it in the Georgics; Homer sang of it; and Pliny, Hesiod, and Strabo spoke of the methods of making it. Varro tells of a plow with two mold boards. The plow of the ancient Britons was very rude; no man was regarded as fit to be a farmer until he could make his own. The custom was to fasten the plow to the tails of the oxen, and compel the beasts thus to drag it through the ground. An act of the Irish Legislature was passed in 1634, entitled "An Act against Plowing by the Taile," which prohibited the cruel custom. The old Scotch plow was thirteen feet long; the iron part proper being over four feet. The Dutch originated the present style, and brought the plow of the last century to the highest perfection. Thomas Jefferson, before he became President, patented an excellent plow, of which he avowed that the shape of the mold-board was mathematically correct to obtain a perfect furrow with the lightest draft.

In 1860, Mr. F. F. Smith, a shewd, ingenious blacksmith, made his appearance at the Collins works, told what sort of a plow he thought was needed, and said he believed he could make it. The Collins Company cordially joined him, and the result was a plow cast solid from cast-steel, the first ever made. It was found equally adaptable to turf, stubble or fallow land; and those who have used it, aver that it draws easier and takes a land polish better than any other plow. It costs more, too; but it lasts four or five times as long. Any part can be obtained at any time, if necessary to renew it. The share may be heated and drawn out from time to time by any blacksmith. One hundred plows were made, and sold with great difficulty, in 1861. Now, fifteen thousand a year are made, and this patent is rapidly superseding the unreliable sheet-steel plows on the prairies of the West. Such a sudden capture of the market is almost unprecedented in agricultural implements. These plows have been broken here and there to prove their quality, and pocket-knives, cork-screws, saws, and cold-chisels have been made from the fragments. Of some such malleable stuff must the plows have been made that turned up the valley of Jehosaphat; for Joel (chap. iii. verse 10,) calls upon the farmers to forge them into swords. The cast-steel plow of Collins Company is now used, not only in every State of the Union, but in Spanish America, Australia, New Zealand, and in several of the countries of North-western Europe. And still it rapidly extends its peaceful empire.

Have we time for a hasty glance through these works that spread their roofs under the hill like a Japanese city? Let us approach, and enter the low-browed Tartarus. Here at the left is the converting furnace where bars of wrought-iron are thrust into pulverized charcoal, and in a fortnight come forth bars of steel, having found marvelous properties in the contact. Wrought iron is merely a pure iron—a chemical simple—it attains the wonderful adaptability and excellence which give the name of steel, by receiving one-half to one per cent of carbon; and on receiving five per cent of carbon, its form has experienced another radical change, and it has become cast-iron.

Within these inner shops are sweating laborers—a whole regiment—forging the weapons wherewith the farmer and pioneer are to subdue Nature from her rebellious moods.—Here they "Heave O!" under great derricks, and swing tuns of crude metal into place; here they dodge to and fro in the blaze of an awful furnace, grimly suggestive of the quarters which I trust have been prepared in the nether worlds to swallow up hereafter all who don't believe as I do; here they move caressingly about sundry tender moulds; here they preside over a monster like a wool picking machine, into which craws a wheel with long machetes thickly clasped on its periphery—the monster utters a muffled scream, and the dull blades come forth ground and gleaming; here they couch before two score of mighty trip hammers that shout their metallic salutations; here they hover over half a hundred great grind-stones, pressing to the rough attrition, axes, plows, hammers, wrenches, hatchets—stones whose predecessors have burst like bombs. and shot up through the smoky roofs, at the risk of limbs and human heads; here they warily watch huge ovens where tools are baking, and huge tubs where tools are cooling. A vast machine this is—vaster than the spectral shops where the Titans forged the shield of Achilles—and into it go, every year, 10,000 tuns of coal and 6,000 tuns of iron, and out of it fly, over States and seas, 5,000 tools a day!

Does the reader know how an axe is made? A bar of heated wrought-iron is cut up into chunks, and an eye is punched into it by the same movement; then it goes into the bitt shop, where a piece of steel is clasped and welded to the iron and drawn to the edge, then to the temperers to receive their delicate manipulation; then into the grinding shop; then to the polishing shop; then to the blacking room, where the asphaltum is put on to protect the head of the axe; then to the packing room. And while passing through each one of these processes, the instrument is handled by a different professional inspector, and if there is a flaw, or if the temper is faulty, back it goes to the beginning. The Collins method is especially characterized by this rigid scrutiny which assures an excellence remarkably uniform in each completed tool.

The company is managed by a board of eleven directors, all of whom reside in Hartford, except two. One of these is Samuel W. Collins, who has been connected with the company ever since it was established, and whose name and skill first gave eminence to the firm. It has never been my fortune to meet him; but I am told that while maintaining strict discipline, he is very public spirited, and beloved throughout the town. The other is Vice-President Wm. J. Wood, Mr. Collins' enterprising associate.

So much in forty years; how much in forty years more? say, about the year of grace, 1,900? What other wheels and shafts and furnaces and forges will be added? What other inventions? What miracles of steam? What other working bees will buzz through this sweltering hive? And what other homes, flanked with rich gardens, will blossom up and down this valley? May it not, until long after the dawn of that century day, be called from the peaceful fashioning of plow and axe; and may the company be as happy in its president then as it now is in that last of the Cheeryble Brothers, who give to the business his methodical wisdom, and presides with unanimous acceptance, over the village of iron workers.

W. A. C.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Stark mill of Manchester is putting in two turbine wheels of 500 horse power.

The Saginaw Valley, Michigan, it is stated, will ship this season over four hundred feet of lumber to the Western cities.

A correspondent writes that a large deposit of emery has been discovered near Middletown, Conn. He states that numerous tests have proved its quality to be equal to the imported.

The Directors of the Boston, Hartford, and Erie Railroad have completed contracts for the entire distance from Boston to Fishkill, and expect to have it finished before the end of 1869.

Tin mines have been discovered in the Pollock district, Colorado. Two promising mines are being worked reported to yield ore containing seventy-five per cent of metal.

Out of 8,240 barrels of flour inspected at Philadelphia last week only 229 were condemned.

Northern capitalists have bought the old Court House at Macon, Ga., and are going to occupy it as a cotton and woolen mill.

The gold mining interests of Nova Scotia are looking up. A considerable number of mines are steadily worked, and prospecters are quite numerous. A new paper has been started in Halifax in the mining interest called the *Mining Gazette*.

It is said that Pittsburg capitalists have an eye upon the manufacturing facilities at Joliet, Ill., and contemplate the erection of large iron works at that place.

Twelve cars of freight were recently taken from New York to the present termination of the Pacific line, 1,200 miles west of Chicago, a distance of about 2,100 miles from the starting point, without transhipment.

WATER SUPPLY OF PORTLAND.—Portland, Me., is to be furnished with water from Sebago Lake about sixteen miles distant. The trenches for the mains are being rapidly excavated.

ECONOMY OF SCREW PROPELLERS.—Owing to the economy produced in the consumption of coal by the substitution of the screw for side wheels, the sum of $48,400 is annually saved to a single line of French steamers running to New York.

ENGLISH AND AMERICAN RAILWAY CARRIAGES.—Three American carriages weigh only one tun more than two of the English make, and will seat seventy-two more passengers. They are also more durable, and for these reasons are much preferred in South America, which depends chiefly upon the United States for its supply.

The Hartford & New Haven R.R. Co. are relaying portions of their road with steel-headed rails, which are fastened with screws and rubber washers in such a way that the destructive jar of the trains is almost entirely obviated.

PHENOMENON IN INDIANA.—A portion of the track of the Bellefontaine and Indianapolis railroad, about 250 feet long, sank fully sixteen feet and the ground around sank with it. Traffic was interrupted until the track was raised by "cribbing." Fish from twelve to eighteen inches appear where the water has risen out of the crack. A subterranean lake is supposed to exist under the track.

CAVING OF THE CHICAGO RIVER TUNNEL.—The heavy rain and the breaking of the water pipe caused a section of the tunnel now being constructed under the Chicago river to cave in on the 2nd inst. The temporary railroad bridge on West Water street, an immense derrick, and the engines attached went down in ruins. The loss is estimated at $35,000.

FREIGHT TRAIN ACCIDENT.—A freight train on the Boston and Albany railroad, broke through a bridge at Russell, Mass. Just after the engine had passed over, thirteen cars, two of which contained kerosene, went into the chasm. Eight minutes later the kerosene exploded and the fire destroyed the cars and part of the bridge.

Dr. Lewis Feuchtwanger has sent us a specimen of pyrolusite (peroxide of manganese) which is as fine a specimen as we have ever seen. It was taken from the Pembroke mines in Nova Scotia and contains by analysis 36 per cent oxygen. It is entirely free from iron and is beautifully crystallized.

The contractors who built the Metropolitan Underground Railroad in London have made a provisional offer to construct the proposed underground road in New York city, and to furnish all the capital required to complete the road which the projectors may fail to obtain at home.

Large works have been recently established for the manufacture of chrome iron in Maryland and Pennsylvania. The demand for this metal in the arts has largely increased.

The first iron bridge made on what is called the solid lever plan has just been completed. It has a span of fifty feet and is fifteen feet wide. It weighs only five tuns. It was tested in Boston on the 2d inst., and sustained a distributed load of 86 tuns.

THE OPHIR MINES.—The returns of the Ophir mines for the month of June amount to 357 ounces, while for the month of July it was only 247 ounces, operations being interfered with by low water. A heavy rain storm on the 22d of August again filled the steams so that there is now enough water to run the crusher at full speed. A new lode has been discovered in the Ophir ground fifty feet from the old "South Lode" which gives good promise.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of such of the new patents issued by the United States and foreign countries as we may deem of interest to our readers.

FARM GATE.—Lewis Charles, Clear Springs Md.—This invention is a neat, cheap, and easily constructed slide gate, so arranged and operating that it will ordinarily open a passage wide enough to admit a single animal; but, when necessary, can be easily opened to admit a team of any size.

MACHINE FOR MOLDING AND PLANING IRREGULAR FORMS AND CURVED SURFACES.—J. P. Grosvenor, Lowell, Mass.—In this machine there are several improvements upon those heretofore in use, including a new method of constructing the table to prevent its jarring and vibrating, a new feeding device for the manufacture of curved frames, and a new method of adjusting the cutters.

MACHINE FOR PLANING AND MOLDING IRREGULAR FORMS.—J. P. Grosvenor, Lowell, Mass.—The object of this invention is to obtain a simple and inexpensive attachment to machines for molding irregular forms, by which the operator, while leaning over the table of the machine and closely inspecting the operation of the cutter, will be enabled to adjust the cutter head up or down, to any required degree, without removing his eye from his work.

SPUR WHEEL.—C. F. Woodruff, Newbern, Tenn.—This invention is an improvement upon the device patented by the same inventor, May 5, 1868, No. 77 709, and consists in forming the cogs with shoulders so expanded as to bear against each other all around the rim of the wheel, and in trifurcating or dividing the outer ends of the spokes, or radial arms, in such a manner that the inner ends of the inserted cogs shall be inclosed and firmly held between the forks of the radial arms, whereby the whole wheel is made stronger and firmer than as heretofore constructed.

FANNING MILL.—Wm. Stoddard, Winona, Minn.—This invention consists of an improved agitating apparatus for facilitating the feeding of the grain from the hopper. Also, an improved apparatus for separating oats or other long grains from wheat. Also, in combination therewith, of an improved screening apparatus for separating cockle and other small grains from the wheat.

RECTIFYING APPARATUS.—W. G. Barette, Canton, Md.—This invention consists of an arrangement of condensing chambers and a cooler for separating and returning the oils. Also, of a condensing and returning apparatus for the low wines; and also of an arrangement for taking off the low wines at the latter part of the operation.

STOVEPIPE SAFE.—Gunder E. Hammer, Rochester, Minn.—The object of this invention is to provide a ready means of access to the air chamber of that class of stovepipe safes which are constructed of sheet metal in two parts, having an air chamber between them and provided with openings for the passage of air through the said chamber. It consists in constructing one or both ends of two parts and hinging one of the said parts to the cylindrical portion.

LAMP CHIMNEY CLEANER.—M. N. Lovell, Erie, Pa.—This invention consists in one or two curved handles provided with clamps, whereby a number of slips of soft paper may be clamped to the said handle upon the bent portion thereof in such a manner that the slips may be turned over like the leaves of a book, and one after another used as they become foul, the said cleaner to be inserted in the chimney when used, in the ordinary manner.

KNITTING MACHINE REGISTER.—B. B. Bolinger, Louisville, Ohio.—This invention consists in providing a pattern wheel the periphery of which is provided with notches, corresponding in distance from each other with the changes required to be made in the knit fabric, and which is operated through the medium of gearing connected to a ratchet wheel which receives motion from a pawl connected to some regularly intermitting moving part of the knitting machine, the periphery of the said notched wheel causing a bell hammer to strike as each notch passes a given projection on the arm of the bell hammer, different signs and figures of pattern wheels being provided for different kinds of work.

CORRECTION—RUBBER BILLIARD BALLS.—In our notice of this new invention, on page 167, current volume, in was incorrectly stated that "the constant expense for renewing the stock of billiard balls amounts for each table to $32 for eight sets per year." But the fact should have been stated thus: The expense of renewal is from $25 to $35 each set per year.

ENVELOPE.—Sigismund Ullman, New York city.—This invention relates to a new and improved mode of cutting envelopes, whereby the same, when folded and fastened or sealed, will not admit of letters or documents being abstracted without defacing or tearing the envelopes. The invention further relates to a new and improved application of an eyelet seal or fastening to the envelope, whereby the former are permanently attached to the latter, so that they may be sold with them, and purchasers or users enabled to seal the envelopes with the greatest facility.

BRICK MACHINE.—Peter Hayden, Pittsburg, Pa.—This invention relates to a new and improved machine for molding and pressing bricks, and it consists of improved means for conveying the clay from the crushing or rolling mill to the press boxes, and also in a novel and improved construction and arrangement of parts for molding and compressing the clay and discharging the same after being compressed.

ENVELOPE.—S. Ullman, New York city.—This invention relates to a new and useful improvement in envelopes, and has for its object the folding of the ends of an envelope in such a manner as to effectually preclude the possibility of letters or money (bills) being abstracted without tearing or defacing the envelope. Letters and money are at present frequently abstracted from the ordinary envelopes by means of a bent wire and other instruments without injuring or defacing them in the least.

COOKING APPARATUS.—J. S. Field, Brooklyn, N.Y.—This invention relates to a new device for boiling by steam various articles in one single vessel, which is divided into various compartments by fixed partitions, so that the articles to be boiled may be separated from each other that they might retain their original flavor.

WATER WHEEL.—Vincent M. Baker, Preston, Minn.—This invention relates to a new and improved water wheel of that class which are placed on a vertical shaft and are commonly termed "horizontal wheels."

POCKET-BOOK PROTECTOR.—Alfred Arnemann, Guttenberg, Iowa.—This invention consists of a spring catch attached to the pocket-book, and of a wire clasp fastened to the pocket or garment. The spring catch can be easily fastened to the clasp, whereby the pocket-book will be securely locked in the pocket or to the garment.

FACE TESTER FOR MILL STONES.—James Kuhn, Mount Pleasant, Penn.—This invention relates to a new and useful substitute for the "staff," which is now used for marking the faces of mill stones in order that they may be cut down and brought into a plane when rendered uneven by wear.

LOCOMOTIVE BOILER.—Quintin Parker, New York city.—This invention relates to a new manner of constructing the fire places of locomotive boilers, and its object is to produce a boiler in which the lower flues cannot be clogged by cinders and ashes, and in which a fire place of just sufficient size is arranged. The invention consists chiefly in the application of a discharge channel, through which the ashes, cinders, and other impurities can, from the inclosed plate in rear of the flue sheet, fall to the ground so that thereby the lower flues are kept clear.

GRAIN MOISTENER.—L. J. Adams and J. H. Esale, Avon, Ill.—This invention has for its object to moisten and toughen the bran of hard or frozen wheat and soften the berry so as to raise the quality of the flour and facilitate the bolting of said flour.

BIN FOR SUGARS, TEAS, ETC.—Morgan L. Rich, Sand Bank, N. Y.—This invention has for its object to improve the construction and arrangement of sugar bins so as to make them more convenient in use, the bins being arranged more compactly than is possible when they are constructed and arranged in the ordinary manner.

BINDING ATTACHMENT FOR REAPERS.—Joseph K. Bull, Buckingham, Iowa.—This invention has for its object to furnish an improved attachment for reapers to facilitate the binding of the grain, and at the same time to enable the bundles to be deposited upon the ground in groups of six or more.

WAGON BRAKES.—Hugh Davidson, New Salem, Ill.—This invention has for its object to furnish an improved automatic brake which shall be so constructed as to adjust itself properly to all positions of the wagon, which can be cheaply and easily made by any blacksmith, which shall be more durable than other brakes now in general use, and which shall be capable of being applied to any wagon.

CHALK AND SANDPAPER HOLDER.—Charles F. Ritchel, Chicago, Ill.—This invention has for its object to furnish a neat, simple, and convenient chalk and sandpaper holder for billiard cues, which shall be so constructed and arranged as to be easily carried in the pocket so as to be ready for use at any time.

CORSETS.—Mrs. Emilie J. Meriman, New York city.—The main object of the present improvements in corsets is to so construct the same as to relieve the hips of the wearer, from the great weight of the clothing which with the use of the ordinary corsets bears thereon, and transferring it to the shoulders in such a manner as to cause no feeling of uneasiness, and to allow the greatest possible amount of freedom of movement to the waist or body.

TELEGRAPH INSTRUMENT.—Robert K. Boyle, New York city.—This invention relates to a new telegraphic printing apparatus, which is so arranged that it will adapt itself to every variation of the weather, and that it will utilize the whole power of the current. The invention consists, first, in a new arrangement of connecting the magnet with the electro magnets. In this apparatus four electro magnets are employed, a pair being arranged on each side of the horseshoe magnet. The two electro magnets on each side are arranged one above the other. Two horseshoe magnets are firmly secured to an oscillating horizontal bar, in such a manner that each end of each horseshoe is between the two opposite face plates of two opposite electro magnets. By means of this arrangement the through current, which is generally obtained, is avoided, and the horseshoe magnet will more easily change its position when the polarity of the electro magnets is reversed.

GAS MACHINE.—Hiram S. Maxim, New York city.—This invention relates to a new gas machine which is so arranged that the production of gas will be entirely automatically regulated, and that the volume of gas as well as its pressure, is under automatic control. The invention consists in the arrangement of the various devices for regulating the pressure of the evaporated gas, for regulating the quantity of illuminating gas made, and for regulating the supply of air to the machine.

REGULATING WATCHES.—Frank G. Johnson, Port Richmond, Staten Island, N. Y.—This invention relates to an improvement in watches, whereby the regulating hand of the watch is so operated that it may be adjusted with the greatest nicety, and the invention consists in fixing a fine thread screw in the watch, with a movable grooved nut thereon, which nut, as it is turned on the screw, moves the regulating hand.

COMBINED SPUR AND CREEPER.—Ferdinand Mehrmann, Fountain City, Wis.—This invention consists in providing to the sides of an ordinary or suitable spur, a bow-shaped bar or plate with teeth on one side; said plate or bar can be either turned forward under the sole of the boot or shoe, to be used as a creeper, or it can be folded back over the heel, where it will be out of the way, the whole instrument being then only a spur. By means of a suitable fastening device, the bow can be locked to the spur in either position.

MEAT CHOPPER.—Thomas Payne, Grand Rapids, Mich.—This invention has for its object to furnish a simple, convenient, and effective machine for chopping sausage meat and other substances, which shall be so constructed and arranged that the chopping box may be revolved automatically, with a slow and steady movement, bringing a new part of the substance to be chopped beneath the knives at each stroke.

SERVICE PIPE FOR WATER OR GAS.—Edward Hagan, New York city.—The object of this invention is to protect water or gas pipes from freezing up, and to provide a ready means of withdrawing and repairing such pipes when the same require inspection, cleaning out, or repair without the necessity of digging up the whole length of ground pipe from the main, thus avoiding delay, inconvenience and great expense.

LADDER FOR LAMP-LIGHTERS.—M. M. Smith, Nashville, Tenn.—The object of this invention is to provide a simple, portable, and effective step ladder for the use of lamp-lighters.

FANNING MILL.—H. A. Snyder, Shullsburg, Wis.—The object of this invention is to provide a governor for fanning mills, which acts automatically to prevent the grain from being blown over the sieves when the fans are driven with very high velocity, or to so adapt itself to a low velocity that the grain will be perfectly cleaned in that case. It consists of a hinged board forming part of the box or cylinder, the said board being suitably connected with the gates which admit air to the box, that the movement of the said gates to shut off the excess of air to the box is dependent upon the movement of the hinged board, which latter is itself actuated to movement by the antagonistic forces of a spring and the current of air developed by the fan wheel. When the force of the current of air exceeds that of the spring, the board raises, and being connected with the gates, actuate them to shut off a portion of the entering air, but when the force of the spring is in excess, the board tends to approach the outer ends of the fans, and in so doing moves the gates to admit a greater supply of air.

COFFEE MILL.—Wm. H. Barns, New London, Conn.—This invention consists in placing a coiled spring around the arbor of the rotating grinding plate or runner, so-called, of a coffee mill or such other analogous grinding mills as are susceptible of and are improved by the application of the coiled spring as above mentioned.

CHURN.—C. M. Lightner, Harrisburg, Pa.—This invention consists in a cubical or oblong box, by means of suitable trimmers affixed to any two diagonally opposite corners of the said box, and providing the box with an internal dasher or revolving frame, which is actuated by suitable mechanism to revolve in a contrary direction to the box, and thus produce a thorough agitation of the milk, whereby butter will be formed in short time.

PIANO HAMMER.—C. W. Brewer, Racine, Wis.—The object of this invention is to obviate the so called bell tones which result when the lower octaves of a square piano are struck with force. The invention consists of a soft rubber tube, or volute, inserted in the felt portion of the modern felt and buckskin hammer head, and by this composite is produced the proper elastic action of the whole head.

STUMP EXTRACTOR AND REMOVER.—C. C. Manuel, North Troy, Vt.—The object of this invention is to provide a machine for extracting or removing stumps, large stones, and other ponderous articles. It consists in a strongly braced frame raised by uprights to a suitable hight above the axle trees of a stout running gear or wagon, and provided with mechanism for extracting stumps or lifting from the ground any ponderous bodies, as large stones, logs, and the like.

APPARATUS FOR DRAWING OFF STARCH.—Colgate Gilbert, Buffalo, N. Y.—This invention relates to a new and improved method of constructing apparatus for drawing off starch and other substances held in solution or suspension in water, whereby the separation of the starch or other substance from the impurities is effected automatically and perfectly.

BELTING, ETC.—Thomas Standring, Port Richmond, N. Y.—This invention relates to a new and improved method of constructing belting, or traces, or other straps now made of leather only, or of any one material, whereby the strength of the same is greatly increased.

PESSARY.—W. F. Chrisman, Trenton, Tenn.—This invention consists of an elastic air vessel composed of a combination of textile fabric and india-rubber, the layer of india-rubber being interposed between the textile material thus uniting the two layers of the latter. It consists also of the form given to the instrument together with a stop cock attachment therefor which latter is employed in inflating the same when in the vagina.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

R. S., of Mich.—Pozzolana is brought from Pozzuoli, near Naples, and consists of volcanic ashes, concreted into a cellular mass of a baked appearance and rusty color. When a proper proportion of it is made into mortar with lime and sand, it sets speedily under water, making one of the best water cements known.

R. L., of N. H.—To make a fine red lake, take coarsely powdered cochineal 1 oz., water and rectified alcohol each 2 oz., digest for a week, filter, precipitate with a solution of tin added every two hours until the color is all thrown down; wash with distilled water and dry. It will not pay you to make it on a small scale.

J. L. S., of Ohio.—A good whitewash for out door work is made by adding to ordinary lime whitewash two ounces of glue, well dissolved, to a gallon of the wash, and also one half a pound of whiting.

J. O. B., of N. Y.—The incense burned in Catholic Churches, is gum olibanum. It is best pure, but is frequently adulterated with turpentine.

G. W. F., of Mass.—Are hydraulic presses ever used for raising buildings? If so how is the power applied? Could the power of two men at the pump be sufficient to raise a large building? Ans. They are. The power may be any motive power used for any other purpose. The power upon the pump necessary to raise any given weight, depends upon the relative area of the pistons. Theoretically a press might be constructed so that a mouse could raise one of the Egyptian Pyramids.

G. L. M., of N. Y., writes us in regard to crank-engines. he thinks he differs from us in our views expressed on page 121 of the present volume, the fact is we are perfectly agreed. The difference is simply in the construction of terms. We used the term applied, in its philosophical sense, *i. e.* used to produce an effect. Mr M. will admit doubtless that the full application of steam to the production of motion is only made through a portion of the stroke in a crank engine. The admission of steam into the cylinder when the crank is in the dead center, would not be the application of steam to the production of motion because in that position no motion can be obtained. The words admit and apply are not synonymous.

C. M. B., of N. Y.—The subject of your letter, the use of compressed air as a motor and the utilization of waterfalls for that purpose, you will find treated in this issue under the head of "Transmission of Hydraulic Power." We shall write again on the same subject, as we deem it of great importance. The article also on page 179 current volume, entitled "Solar Heat," treats on a branch of the same subject.

H. E. L., of N. J.—This correspondent, referring to an article on paper on page 36, current volume, SCIENTIFIC AMERICAN, in which the okra plant is mentioned as a material for paper making, suggests "Bagasse" or "bergasse," the crushed sugar cane, as a possible useful substitute for rags in the manufacture of paper. He says that it may be obtained in almost unlimited quantities on sugar plantations, where the only use it is put to is as a fuel. The outer shell of the cane is similar to straw which has not yet proved to be a competent substitute for rags. The pith, we think, lacks the fibrous quality requisite for conversion into paper. We believe the address of the Okra Paper Company is 48 Pine street, New York city.

J. S., of Mass.—We know of no better varnish for loom harnesses than that made according to the following recipe, used by an overseer of cotton weaving of more than thirty years' experience: 2 gallons linseed oil; 2½ lbs. gum shellac; 2 lbs. litharge; 1 lb. red lead; 1½ lbs. umber, ½ lb. sugar of lead.

P. J., of Minn.—Why does not the gas in a pipe burn when it is lighted at the orifice?" Such a question is puerile. Hydrogen gas—the common "illuminating" gas—is not inflammable. It requires oxygen to produce and sustain combustion, and that is found in the atmosphere, which must be mixed with the hydrogen to produce a flame.

S. O. L., of Ohio.—Malachite is a native oxide of copper. The best specimens are found in Siberian copper mines. It is used for ornamentation as veneers generally, although now quite fashionable for brooches, ear drops, etc. Probably the finest native and wrought specimens in this country are those sent as presents to the late Gov. Thomas H. Seymour of Connecticut by the Emperor Nicholas of Russia.

T. of Malvern, Eng.—In the solution of the problem you send us you accept the velocity of the wave of sound as 2,000 feet per second, and the apparent velocity as 2,080 feet.—This is all wrong. The theoretical velocity uncorrected for temperature is 916 feet, corrected for temperature it is 1090 at the freezing point and one foot more for every degree above this; 1,100 feet at 42° Fah., 1,140 feet at 82° Fah., etc. Your calculation based on these erroneous premises is therefore incorrect. You ask, "Who hears the true pitch of the whistle of a moving locomotive." Of course those who remain at the same distance from the sounding body, viz., the people on board the train, and those at a great distance at right angles to the direction of its motion; those whom the train approaches hear it sharper, those from whom the train departs, flatter than it really is.

F. M. B., of Ky.—The ink stains in the piece of goods you send us are to a considerable extent removable by pure water, without changing the original color. For what remains of the stains use, carefully, oxalic acid. The red color produced by the acid in the original dye can be restored by ammonia.

R. S. T., of Ala.—Kalsomine is composed of zinc white mixed with water and the sizing of glue. The surface to which it is applied must be clean and smooth. For ceilings mix half a pound of glue with fifteen pounds of zinc; for walls a pound of glue, with fifteen pounds of zinc. The glue, the night before its use, should be soaked in water and in the morning liquefied on a fire. It is difficult to prepare or apply kalsomine; few painters can do so successfully, Paris white is often made use of for it, but it is not the genuine article.

P. O. A., of Minn.—To make fire-proof mortar, take two-thirds of the best lime and one third of smith's black dust, and mix with the necessary quantity of water. The will form a mortar that will set nearly as hard as iron, and is the best to use for setting the firebricks in or about fire places.

S. M., of N. J.,—A printer's error vitiated our answer to your query last week instead of being, the superheating surface in marine engines is too *small* it should have been too *large*.

S. O. O., of Mass.—We can highly recommend the following recipe for paste for polishing furniture: Three ounces of white wax, half ounce of Castile soap, one gill of turpentine. Shave the wax and soap very fine, and put the wax to the turpentine; let it stand twenty-four hours; then boil the soap in one gill of water, and add to the wax and turpentine.

Business and Personal.

The charge for insertion under this head is one dollar a line.

NEW PUBLICATIONS.

THE THREE VOICES. By Warren S. Barlow. Boston: Wm. White & Co., publishers.

The author of this volume is not well known to literary fame; nevertheless he has produced a poem of 181 pages, which has the merit of a rhythmical composition classified under three headings—The Voice of Superstition, The Voice of Nature, The Voice of a Pebble—and partakes of the nature of a criticism upon things held sacred, and is not exactly orthodox in its theology. We have never considered it profitable to read skeptical works, for at best our ideas of the Christian faith are too loosely regarded, as a general rule.

PERSONAL HISTORY OF ULYSSES S. GRANT. By Albert D. Richardson.

We have received a copy of the above work of 560 pages from the American Publishing Company, of Hartford, Conn. Mr. Richardson is a very graphic and careful writer, and in his new volume he has grouped together a great variety of incidents in the life of the illustrious subject, which will be read with interest long after the heat and prejudice of party warfare has passed away.