being come to—such as a spring—for the whole tunnel is far below the bed of the river water—it would give indications of its presence in the moisture of the clay long before the miners reached it. In the course of the excavations of the shield, about 2,000 cubic yards of the London clay have been dug out for the tunnel alone. This, as fast as it was cut out, was run out in little "trolleys," to the Tower Hill shaft, and hoisted up to the outer air. But every "trolley" dropped its quantum in the tunnel till the base of the tube became covered with some six or seven inches of sticky, wet clay. This has all been removed, and the tunnel, as far as it has gone, is now clean from end to end.

The result is, that all that passes on the river over head is ten times more distinctly heard than ever. The passage of a steamer is heard with a noise so loud and vibrating in the at present confined air of the tunnel, that it is only the knowledge of the unalterable and almost immovable strength of the structure in which you stand that gives the hearer confidence. Not only can every vessel be heard passing—we speak of course of steamers, large or small—but even such slight noises as hammering on the ships in the Pool above can be distinguished not only by the sound, but even by the slight though perceptible vibration of the air. Yet, the whole tunnel is not only water-tight but air-tight. The tests taken for deflection, or any settlement in the iron tube, since it has been built, give results that show a stability that apparently nothing but an earthquake can unsettle. The greatest deflection was only one eighth of an inch from the true level, and in only two instances was it one sixteenth. As far as regards the tubes bearing pressure, they are equal now that they are formed in circles, to about ten times the pressure they can possibly have to bear, and to more than twenty times the pressure that is now laid on them. Altogether about 864 rings have now been laid and bedded in with blue lias cement. About twenty more rings will complete the entire tunnel from Tower Hill to Tooley st. The descent down the shafts will be by means of lifts. These are to be constructed on a special design of Mr. Barlow's, so as, in case of accident, such as the giving way of any of the apparatus, to clip the guiding rods and check the progress of the lift in a few feet. This invention, in fact, is only a very clever break, which, instead of acting instantly, and with a sudden jerk, as bad as a fall, slowly brings the lift to a standstill in about ten ft. This arrangement has one especial merit, which is, that it is never likely to be called upon; for the wire rope which is to raise and lower the lift is to be about fifty times stronger than its supposed strain, so that there seems very little chance of its breaking with the weight of ten people, when it has been tested to bear more than the weight of a hundred. The lift is to be a mere little iron room, built to hold ten people with comfort, though, from the ample space intended to be allowed, it might hold twelve with almost equal ease. The omnibus at the foot of the shaft is to hold fourteen. The time of transit from Tower Hill to Tooley st. is to occupy three minutes, and the fare is to be a penny.—*London Times.*

HORSFORD'S PHOSPHATIC BREAD.

RUMFORD CHEMICAL WORKS *vs.* JOHN E. LAUER.—In this case, tried before Judge Blatchford, it will be remembered a decision was given against the plaintiff on the first claim, on the ground of want of novelty; it being contended by the defense that a pulverulent phosphoric acid was made by Berzelius under the name of three fourth's phosphate as early as 1816. The plaintiff maintained that the three fourth's phosphate of Berzelius was used for making bread, and moreover that the experts for the defense had not made the three fourth's phosphate, nor had they followed the process of Berzelius.

Since the decision was rendered the chief witness for the defense has found that he was mistaken, and it appears that there is no evidence in the case impairing the claim for originality by the patentee.

Upon affidavits setting forth these facts, the Judge has ordered the case to be re-opened for further testimony, and a new hearing and a new decision. For particulars respecting the trial, see page 105 of the present volume of SCIENTIFIC AMERICAN—"When Doctors Disagree, who Shall Decide?"

Enormous Sale of Newspapers.

The *Herald* publishes a tabulated statement of the sales of newspapers in New York city for the six months ending September 30th, from which it appears that an aggregate of six million dollars' worth of city newspapers was sold in that time. The *Herald* has the largest daily sale; and the *Ledger* stands at the head of the weekly issues. The law requires a tax to be paid upon gross receipts in excess of $5,000 per annum. The *Herald's* table is compiled from the official tax list, and is no doubt correct. The SCIENTIFIC AMERICAN appears to be the only journal published in the city devoted to mechanical and engineering science whose receipts from the sale of papers exceed the sum exempt by law from taxation. The excess upon which we were required to pay taxes during the past year, amounted to $77,241.

There are but six papers reported in the table referred to whose circulation equals that of the SCIENTIFIC AMERICAN. It is, no doubt, by far the best advertising medium in its specialty to be found in the country.

Explosion at a Wood Preserving Establishment.

An explosion of one of the tanks used by Robbins' Wood Preserving Company, for saturating wood with carbolic acid, took place at their works in Third street, Brooklyn, on the evening of the 26th October, killing Mr. Martin Voorhees, the inventor of the peculiar form of tank used, also killing a laborer employed in the establishment, and injuring several others. A member of the firm has since publicly explained that the explosion was in reality a steam explosion; the new tank being an experimental one in which the wood was placed in the same tank with the dead oil from which the acid was distilled, and the steam being generated under high pressure from the sap contained in the green wood falling upon the hot oil at the bottom.

Per contra, a correspondent of the *Herald*, writing in regard to this explanation of Mr. Robbins, asks how it happens that the remains of the two unfortunate men who were killed were blackened and charred, and their clothing nearly burned off, if "superheated steam" caused the explosion. And again, whether this explosion, as well as the one in Jersey City last spring and the other in San Francisco last summer, which resulted from the attempts to put this same process into practical operation, are not attributable to some fatal error in the process itself, which renders it altogether impracticable. He also states that the explosion in San Francisco caused the loss of seven lives and more than $50,000 worth of property.

Editorial Summary.

TELEGRAPH APPARATUS.—Mr. Chas. Durant, of New York city, is the inventor of several improvements of a practical nature, intended to lighten and facilitate the labors of telegraph operators. The present improvement relates to the relay machines, and its object is to do away with the trouble commonly experienced in regulating the adjustments of the instrument. In this patent Mr. Durant, among other things, claims "So combining a relay machine and one or more batteries, or other electrical supply, with a telegraph instrument, that when, by the operation of the instrument, the main telegraph circuit is opened or closed, another circuit, communicating with the same relay machine will be correspondingly opened and closed, and the attractive power developed in the relay magnet will be thereby modified.

EFFECTS OF DISCHARGES OF ARTILLERY UPON CLIMATE.—A correspondent from Missouri suggests that continued discharges of artillery induce rain storms. He cites the observations of several gentlemen who stated that during the wars of Napoleon heavy battles were uniformly followed by heavy rain storms. He suggests also that perhaps the change in climate of the Plains (referred to on page 214, current volume) along the line of the Pacific Railroad, may be effected by the concussive effect, similar to that produced by the discharge of cannon, caused by the passage of trains over the hitherto undisturbed plains. All we can say on this matter is, that until a direct connection between atmospheric concussion and the fall of rain has been established, we must regard it as merely a conjecture.

METHOD FOR CROSSING STREETS.—Messrs. Adam and Nicolas Barth, of New York city, have submitted to us a plan for street crossing, which is perhaps worth consideration. It employs the principle of the elevator, with horizontal elevated rails to convey the platform from side to side. Passengers step upon the platform, are raised to the proper hight, conveyed across, and let down upon the opposite side of the street. Mechanically this is perfectly practicable, and it might prove more acceptable than bridges. The plan is certainly free from some of the objections raised against bridges, though it might be found on trial to have some defects which the bridges do not have.

OLEOGRAPHY.—This is the name given to the new art of fixing on paper the special forms which a drop of oil assumes when poured on water. These forms, or patterns, vary with every sort of oil, and are exceedingly interesting and beautiful. Oleography may be briefly described thus: Having obtained the oil pattern, lay on it for an instant a piece of glazed surface paper, then take it off and place it on a surface of ink or any other colored fluid in water or spirit. Now wash off any excess of color with plain water; when dry, the pattern is fixed. The paper becomes greasy where the oil is present and thus resists the action of the ink, but it is rapidly absorbed on the blank places.—*Septimus Piesse.*

STEAM JETS IN BURNING BRICKS.—The essential feature of this invention consists in so constructing a brick kiln that the products of combustion from fires contained in furnaces at one end of the kiln are caused to forcibly permeate the mass of bricks by the action of jets of steam or other equivalent exhausting device situate at the opposite end of the kiln, and *vice versa*, the products of combustion being caused to pass through the mass from one end to the other of the kiln first in one direction and then in the opposite direction, thereby heating the bricks uniformly throughout; jets of steam are also directed into the combustion chambers and over the fuel of those fire-places which are in action for the time being, as well as into their corresponding ash-pits.

AERIAL NAVIGATION.—We would call the attention of our readers to an article on "Aerial Navigation," which appears in this number and which is the first of a series of articles to appear on this subject. Many practical and scientific men believe we are on the eve of new discoveries which will render the navigation of the air practicable, notwithstanding the failures which have hitherto attended experiments in this field. In this state of expectancy, the history of some of the most prominent events in the science of aerostation, especially those which have occurred in our own country, can not fail to be of interest.

A COMPANY has been formed in Lynchburg, Va., for the purpose of establishing works for extracting compounds from oak bark. They expect to begin operations very soon.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The castor bean is becoming an important industry in Perry county, California. One prominent dealer received at his warehouse 1,000 bushels in one day, paying $3·18 per bushel. It yields more bushels to the acre than wheat.

Tanned cotton, or "cotton leather" is prepared by treating cotton fabrics in a manner similar to that in which skins and hides are treated for the manufacture of leather. Cotton is thereby made stronger and better able o resist the effects of moisture.

There is only one steam fire engine in France. This is one of the American pattern, and is owned by the city of Havre. The other French towns, including the capital itself, depend for the extinguishment of fires upon hand-engines, about the size of a garden hose, and worked by soldiers, called *pompiers*.

M. Morin states in *Cosmos* of October 2, that he has in his possession wooden water wheels which have been in use more than 1,500 years forthe evacuation of water from a copper mine. These wheels are more than 18 eet in diameter. The wood was found on analysis to be perfectly sound, and to be partly converted into a compound of cellulose and copper.

The following statistics of coffee production are given by Professor J. Darby. Of the 713,000,000 lbs. produced by the world, per annum, Brazil furnishes 400,000,000, or more than half of the whole. Java 140,000,000, Ceylon 40,000,000, St. Domingo 40,000,000, Cuba and Porto Rico 25,000,000, Venezuela 25,000,000, Sumatra 25,000,000, all others, including the Mocha, 18,000 000

A ship called the *Ariadne*, of 1,400 tuns register, and 200-horse power, is to sail from London on the 16th of November for Buenos Ayres, for the purpose of bringing live cattle from South America to England. The vessel was built expressly for the end contemplated. Her return is expected about February next, and if the voyage will prove a success, other ships are to be built on the same principle, and a regular trade in live cattle will be established.

Attention is called by the Argentine Government to the National Exhibition to be held at Cordova about the 17th of April, 1870. Foreign machines and products of art, industry, and science are to be admitted on an equal footing with those of native origin. Details regarding the conditions of exhibition, the provisions for transportation, etc., may be had, on application, from the Minister Plenipotentiary or any of the consuls of the Argentine Republic in this country.

Mr. Lange, the London representative of the Suez Canal Company has made some experiments on the canal with a corvette carrying ten Armstrong guns and driven by engines of 300-horse power. He has ascertained the following important points: First, the speed necessary to be maintained on a vessel of the dimensions of the ship experimented with, in order to enable a straight course to be steered, is from 3·2 to 3·7 knots an hour. Second, the embankments suffered no injury while the vessel was going at a rate of 5·4 or 6·4 knots an hour. Third, it was found that the loss of speed incurred by the vessel navigating the canal when compared with the rate on the open sea in smooth water, amounted to one fourth, the same power being employed in both cases.

While some of the workmen employed in a pit situated at the east end of Clarkstreet, Airdrie, Scotland, were working in a seam of gas coal, called the Tongue seam, they turned out a frog which had been embedded in the coal. They had just fired a shot, and out of the debris issued a pretty golden-colored frog, dead, to be sure; but the body was warm and fresh, as though life had been newly extinct. The seam was 60 fms. deep, and had been previously worked as an ironstone pit at a less depth. There was, however, 50 fms. of rock penetrated before either of these seams were reached. The frog was about 6 in. long by 4 in. broad. The miners cut up the body, and discovered gas coal in a paste state in the stomach. Supposing the frog firmly embedded in the coal, how would the poor batfachian's jaws find room to perform the duties of mastication, even supposing it had got successfully located inside an uctuous seam of gas coal? Or are we to suppose that it imbibed the coal paste through the pores of the skin?

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

CULTIVATOR.—J. H. Lockie, Humphrey, N. Y.—This invention has for its object to furnish an improved cultivator which shall be so constructed and arranged that it may be readily adjusted to cultivate rows of plants at different distances apart, and which shall at the same time be strong, durable, and not liable to get out of order, or be broken by striking a stone or other obstruction.

PRINTERS' GALLEY.—William Quail, New York city.—This invention has for its object to improve the construction of printers' galleysso as to make them more convenient.

PORTABLE FENCE.—Jacob Closs, Decatur, Ind.—This invention relates to new and useful improvements in fences forfarm and other purposes, and consists in supporting the fence clearof the ground by means of braces and double iron clevises.

PROPELLING WHEELS.—Thomas Bell, Bellport, N. Y.—This invention relates to a new and useful improvement in wheels for propelling vessels in the water, whereby they are rendered more effective than when made in the ordinary manner.

PROCESS FOR TREATMENT OF CANCER.—Lawrence Roy, Plattsburg, Mo.—This invention and discovery relate to an improvement in the treatment of cancer diseases.

SPIRIT LEVEL.—A. P. Odholm, Bridgeport, Conn—This invention relates to a new and improved plumb and level of that class in which the alcohol is confined within a circular chamber.

MACHINE FOR BLEACHING CANE JUICE.—Evan Skelly, Plaquemine, La.—This invention comprises an improved arrangement of automatic feeding and air supplying apparatus for the furnace; also, an improved arrangement of cooling devices through which the gas is passed and cooled in the presence of water; also, an arrangement of means for agitating the juice, exhausting the air, and providing the gas thereto, in a manner to produce the most intimate contact of the gas with the particles of juice for bleaching.

CLOTHES BARS.—L. J. Adams, Hoosick Falls, N. Y.—This invention relates to improvements in the construction of that class of clothes bars made in frames or panels and hinged together so as to swing open on the hinge joints horizontally when standing on one end. The invention consists in a peculiar way of hanging the said frames or panels to a common center, so that when extended they will radiate from a common center, nstead of assuming a zigzag or serpentine line.

CAR COUPLING SHACKLE.—J. Marston, Saratoga Springs, N. Y.—This invention relates to improvements in shackles for connecting cars together in trains, and consists of an improved arrangement of double jointed bars specially adapted for connecting cars of different hights.

GATE LATCH.—F. M. Ranons, Little Shasta Valley, Cal.—This invention consists in a sliding latch having a hooked end and a spiral spring arranged to constantly draw the latch into the case which is fixed on the gate; also, of a double beveled catch which draws the latch lengthwise and at the same time raises it when the gate shuts, and behind which the hooked end of the latch is drawn back into a notch by the spring, the said notch holding the gate closed and preventing the latch from being lifted up by animals.

SOFA ATTACHMENTS.—H. C. Grube, Plaquemine, La.—This invention relates to improvements in sofas and lounges, having for its object to provide a convenient arrangement of table, wash stand, bureau, and drawer attachments calculated to combine in a sofa or lounge the necessary outfit of such articles for a room, in a portable form, and so arranged as not to give an objectionable appearance to the articles.

POTATO DIGGER.—J. J. Singley, Lafayette, Ind.—This invention consists in the application to a scraping plow, and endless screening device arranged in connection therewith on a frame borne upon two wheels, of certain vine cutting devices, to prevent, as much as possible, the gathering of the vines on the screen and clogging the same; also, an earth discharging apparatus and screen shaking and brushing apparatus.

STALK CUTTER.—R. A. Boulware, Doniphan, Kansas.—The present invention relates to a new and useful device for cutting up the stalks of corn, etc., in the field, preparatory to plowing the same, the machine for this purpose having a crushing or braking roller in front, which is immediately followed by a series of knives set in a revolving frame behind, which chops up the corn stalks and leaves them lying on the surface.

GUN LOCK.—J. M. Hill and R. D. Hay, Crooked Creek, N. C.—This invention consists in the application to the barrel around the nipple of a raised projection over which the hinged cap will close snugly when closed over the nipple, so as to wholly inclose the said nipple for better protection.

ENEMA NAVAL AND UTERINE SYRINGE.—J. J. Essex, Newport, R. I.—The object of this invention is to obviate the difficulty attending the use of the the ordinary syringes, which are worked by means of an elastic bulb, not being devised in such a manner that they can be placed in proper position so as to admit of a person applying or using it with facility and comfort. To obviate this difficulty the elastic bulb is connected with the valve box by means of an elastic tube, which permits the application and operation of the syringe to inflamed or diseased parts without pain or difficulty to the person using it.

MACHINE FOR CUTTING CORKS.—Olney Arnold, Pawtucket, R. I.—The object of this invention is to provide for public use, a machine which will grasp the bark, hold it firmly, and apply the cutting knives to it in such a manner as to cut out the corks rapidly, with great perfection, and with the utmost economy of material, each movement of the operator's lever producing a large number of finely cut corks.

FRUIT-PEESERVING APPARATUS.—C. C. Williams, Brooklyn, N. Y.—This invention has for its object to furnish an improved apparatus for preserving fruits, meats, vegetables, etc., by heating the said substances to the proper degree by the introduction of steam into the lower or bottom parts of the cans in which said substances are to be sealed up.

BOB SLEIGH COUPLING.—William E. Van Schaick, Delavan, Wis.—This invention has for its object to furnish an improved coupling for connecting the front and rear bobs of a bob sleigh to each other, which shall be simple in construction and effective in operation, enabling the movement of the rear bob to be fully controlled or guided by the movement of the forward one.

CAR COUPLING.—Matthew Quinn, Wataga, Ill.—This invention has for its object furnish an improved self-coupling car coupling, designed more especially for freight cars, but equally applicable to other cars, and which shall be so constructed and arranged as to conveniently couple cars differing in hight.

WEATHER STRIP FOR WINDOW SASHES.—Andrew Jackson Devoe, Hackensack, N. J.—This invention relates to a new weather strip for window sashes, by means of which air and water are effectually prevented from being blown through the crevices, between the sashes, and under the lower sash.

PITCHING BARRELS.—J. P. Benoit, Detroit, Mich.—This invention relates to a new and useful machine for pitching barrels for holding beer and other liquids, and consists of a furnace mounted on wheels with a suitable air chamber and pipes attached, connected with a blower, by means of which a current of heated air is forced into the barrel of sufficiently high temperature to open the pores of the wood, and render the pitch so liquid that it readily flows into the pores and is incorporated with the wood, while it is, by properly agitating the barrel, made to cover the entire inner surface and render the barrel perfectly tight.

HEAT RADIATOR.—A. Albee, Worcester, Mass.—This invention relates to radiators for retaining and utilizing the heat of a stove, and in combining therewith an adjustable shelf.

GRATE BAR.—Monroe Morse and Charles H. Morse, Franklin, Mass.—This invention relates to a new and useful improvement in grate bars forfurnaces, and consists in a false bar, or rider, made in one or more sections, which false bar, or rider, is most exposed to the heat, and which may readily be removed or renewed.

WASH BOILER.—Daniel Lucas and James Lucas, Green Bay, Wis.—This invention relates to a new and useful improvement in boilers for washing clothes.

EXPLOSIVE COMPOUND.—William Mills, New York city.—This invention relates to a new and important improvement in the composition of compounds of an explosive character, designed as a substitute for gunpowder and for other explosive compounds.

SHOE LAST.—Wm. C. Shipherd, Willoughby, Ohio.—This invention consists of a graduated adjustable, circular, notched, catch plate attached to the last, and a spring catch on the instep block of peculiar construction, arranged for operation in conjunction with the said catch plate.

COTTON SEED HULLER.—Frank A. Wells, Memphis, Tenn.—The object of this invention is to provide a cotton seed huller more efficient in operation, less liable to clog or be damaged by foul or hard substances, and better adapted for adjustment of the cutters of the concave shell than the machines now in use. It is also intended to provide a more economical arrangement of the cutters in respect of grinding them.

WATER WHEEL.—B. W. Tuttle, Galena, Ill.—This invention relates to improvements in the "Barker mill," and other similar wheels, designed to improve the efficiency of the same, and consists in the application thereto of an improved method of supplying the water; also, an improved arrangement of hollow shaft for transmitting the motion and for employment as an air chamber buoying the wheel; also, in the arrangement of an air chamber at the bottom of the wheel for buoying it, operating as a float to support a portion of the weight of the wheel upon the tail water; also, an arrangement of adjustable buckets and mechanism supported upon the shaft, whereby the buckets may be adjusted while the wheel is in motion, and also several other arrangements of details.

HOP SODA.—Arnold F. Dückwitz, New York city.—Hops have long been esteemed for their valuable medicinal qualities, and Mr. Dückwitz gives them to the public in the shape of a healthful and palatable beverage, which promises to be quite an acquisition to the general stock of curatives. Hop soda is a combination of extract of hops and soda water.

TREADLE MOTION.—E. A. Goodes, Philadelphia, Pa.—This invention consists of a disk or other equivalent device connected to the lower end of a vibrating pendulum so as to vibrate thereon, and to which, at the top, the crank-connecting rod is jointed, and all arranged in such a way that the lower face of the disk being prevented from swinging, an oscillating motion imparted to the axis will swing the top back and forth, so as to impart rotary motion to the crank.

PUMP.—Thomas Metzler, Wooster, Ohio.—This invention consists in an arrangement of means for operating a collapsing bulb pump when suspended in or near the water of a well or cistern to protect it from frost.

GOPHER TRAP.—D. N. Smith, San Bernardino, Cal.—This invention relates to a new gopher trap, which is of very simple construction, and which will be sure to catch the animals if they pass through it.

BOOTS AND SHOES.—Edmund Brown, Burlington, Vt.—This invention relates to a new device for lining the edges of lace shoes and boots, and has for its object to facilitate the fastening of the two flaps or folds, so that the tedious lacing or buttoning heretofore required can be dispensed with.

ATTACHMENT TO ROVING MACHINERY FOR DISCHARGING ELECTRICITY.—Aaron Goodspeed, Granville, N. Y.—The object of this invention is to discharge the electricity which is produced by the reciprocating motion of the rollers of wool and cotton roving machinery.

BALLOT.—Austin B. Culver, Westfield, N. Y.—The object of this invention is to protect and secure the purity of the elective franchise by preventing fraudulent voting, and the invention consists in providing a band around each ballot in such manner that each ballot is kept separate to prevent one voter from intentionally or accidentally putting in two or more votes, or rather to detect such double voting in case it should be performed. The device is cheap and simple, and can be put on or taken off from the ticket in a moment. It would take less time to put it on to a ticket than it would the inspector to find the name on the register, which must be done before depositing the same. It also makes the ballot more compact, consequently they can be deposited, and the opening in the ballot box kept clear, with less trouble.

LIGHTNING RODS.—W. S. Reyburn and F. J. Martin, Philadelphia, Pa.—This invention consists in combining a sheet-copper covering, constructed in a peculiar manner, with a sheet-zinc center, similarly contrived, whence certain advantages result.

MACHINE FOR DRIVING RAKE TEETH.—N. M. and A. T. Barnes, Tiffin, Ohio.—The object of this invention is to construct a simple and convenient machine for driving wooden teeth into the heads of horse hay rakes, that will perform the work more quickly, cheaply, and accurately, and with less danger of breaking or battering the teeth than can be done by hand.

SCREW DRIVER.—J. C. Pinner, Newbern, Tenn.—The object of this invention is to provide for public use a simple and convenient tool with which a screw can be more readily and easily inserted or removed than with the other screw drivers heretofore brought into use.

ADJUSTABLE CIRCULAR SAW-MITERING MACHINE.—J. P. Grosvenor, Lowell, Mass.—The object of this invention is to obtain, in mitering machines having a circular saw, a more simple, cheap, and perfectly-operating device for adjusting the saw while keeping the belt taut at all times, and the table level and of uniform hight. The machine is an improvement upon those patented by the same party May 5th, 1868, and September 15th, 1868, respectively, the difference between the present and the former inventions consisting in the peculiar device for enabling the saw mandrel, although hung in an inclined frame, to be oscillated in a vertical plane. The same construction also enables the operator to raise or depress either end of the mandrel, and by changing the saw to one end or the other its inclination can be adjusted at pleasure in either direction.

BREECH-LOADING FIRE-CRACKER HOLDER.—A. E. Peck, Brooklyn, N. Y.—This invention has for its object to furnish an improved holder for holding fire crackers, which being discharged in such a way that the fire cracker may be discharged or exploded with perfect safety, while projecting the shell of the fire cracker from the muzzle of the holder, and which shall, at the same time, be breech loading.

PARLOR AND SIDEWALK SKATE.—N. W. Hubbard, New York city.—This invention has for its object to furnish an improved parlor and sidewalk skate, which shall be so constructed and arranged as to run with little friction and to pass over obstructions, adapting it for use in the parlor, upon the sidewalk, or upon a street paved with the Nicolson pavement.

MATCH SAFE.—August Steinbök, New York city.—This invention relates to a new match safe, arranged to contain a self-igniting wick—that is, one which will ignite as soon as brought in contact with the atmosphere.

RAILROAD TRACK.—Baron Ludwig Lo Presti, Vienna, Austria.—The object of this invention is to construct a cheap railway, which can be easily constructed, and which is capable of extended application and of ready transfer and displacement. In accordance with this new system railways can be rapidly constructed at a comparative small cost and without any reference to the natural formation of the ground.

SAW SET.—H. Sloat, Watertown, N. Y.—This invention relates to a new implement for setting all kinds of saws; it can be applied without removing the saw from the mandrel, and will set the teeth very accurately and evenly.

COAL STOVE.—George W. Herrick, Stuyvesant, N. Y.—The object of this invention is to construct a heater for burning Western bituminous coal and other tar coal depositing much lamp black, and the invention consists chiefly in providing for ample draft so that all the products of combustion and the solid matter carried off with the same will be burned.

VELOCIPEDE.—Edward A. Lewis, St. Charles, Mo.—This invention has for its object to so construct the cranks of velocipedes that they are made longer where the greatest power is required without increasing the diameter of the circle to be described by the foot. The invention consists in the use of sliding cranks, which project from both sides of the shaft, one end of each crank being guided by a fixed eccentric groove or track in such manner that the crank pin is moved away from the shaft as long as the power is applied to the same by the foot; when the power is not required on the return stroke, the crank pin is drawn close to the shaft, and thus, without describing a large circle, the crank lever is made longer than usual, when required for actual use.

BUCKLE.—D. S. Butler, Otterville, Mo.—This invention relates to a new self-fastening buckle, which can readily connect two straps without sewing or other tedious process.

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 correspondents 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.*

F. B.—The best water fence we have ever seen to be used in small streams was made as follows: A gate sliding in upright ways at the ends, like an old-style turnpike gate, has attached to the bottom board (a scantling is better as not so likely to be broken in high water) crutches which rest upon common empty barrels or casks. The uprights at the ends of the gate are provided with friction rollers, so that the gate slides up and down easily in the ways. Two or three casks will generally support the weight of the gate, so that it descends nearly to but does not enter the surface of the water. A gate thus constructed will rise and fall with the water, and if everything is properly made, is not liable to be washed away in high water. A good water gate for fencing purposes is in request.

C. S., of Va.—A simple test will enable you to distinguish between the pulverized carbonate of soda and the chlorate of potash, the crystals of which are so broken as to render them difficult for you to distinguish. Taste would be enough to a person familiar with these salts but premising that you are not sufficiently posted, you can detect the difference by adding to a little of each in the solid state a little sulphuric acid. With carbonate of soda there will at once ensue a great disengagement of colorless gas (carbonic acid) with much frothing. With chlorate of potash the action will be slow while the materials are cold, but when a gentle heat is applied the mixture becomes very yellow and a greenish irritating and suffocating gas (chlorine) is evolved.

C. B., of N. Y.—Time will remedy the disagreeable taste of the water in your newly cemented cistern. We know of nothing you can do but possess your soul in patience.

R. S. M., of Mass.—A cheap attractive device in the way of signs for shop windows is always salable, and there is no doubt that yours is patentable. You would do well to prosecute the case at once Its amusing character would be sure "to draw."