Correspondence

The Preservation of Timber from the Teredo.

MESSRS. EDITORS:—I notice in your last "Notes and Queries" an inquiry in regard to protecting timber in salt water from the ravages of the "teredo" or borer. As any information on the matter was solicited, I wish to state to you what has been done in our vicinity.

The bridge just built over the Taunton river, at Somerset, Mass., for the Old Colony and Newport Railway Company, by Capt. Wm. Cobb, of this place, has nearly half a mile of pile-work, and as the water is infested with the teredo, it became an important matter how to protect the piles; various schemes were presented, but the following method was finally adopted, it having borne the test of experiment in other waters:—

In a building erected for the purpose, a tank was sunk in the ground capable of holding 200 or 300 barrels. A cylinder of best boiler iron was built, sixty-five feet long and five feet in diameter, air-tight. Connected with the cylinder is a small steam engine force pump and air pump. The tank is filled with dead oil or creosote of commerce, an iron carriage loaded with piles is run into the cylinder, and the head, packed with rubber, is screwed down tight. The air pump is put on and a vacuum is produced in the cylinder, then, a valve being turned in the feed pipe, between the tank and cylinder, the dead oil rushes in and nearly fills the cylinder. The force pump is now applied and oil is pumped into the cylinder until the gage shows a pressure of 115 to 120 lbs., then the whole is suffered to rest from twelve to twenty hours, when the oil is allowed to run back into the tank, the head unscrewed, the carriage run out, piles unloaded and all made ready for another charge. The oil is kept hot in the tank by steam from the boiler.

This method is said to have been successfully tried in Germany and England, but I do not know whether it has ever been tried in the United States. Possibly some of your readers may have heard of it often. G. C. B.

Dighton, Mass.

[In Vol. XIII., page 407, we published an article on this subject, detailing the plans which had been adopted in different places for the above purpose. One of the processes therein described was precisely like the one our correspondent describes, except that chloride of zinc was used to impregnate the wood rather than creosote. The letter of our correspondent will prove valuable to many of our readers.—EDS.

Large and Small Pulleys.

MESSRS. EDITORS:—In your valuable paper of April 7th, I notice a communication on the above subject, which is liable to mislead, as can be easily demonstrated by any one who will take the pains to duplicate the experiments mentioned by your correspondent, who has, as is often the case, deceived himself, in some way or other, in his deductions. It is not quite clear, in his statement, that he made the trial with a two-foot pulley. I would advise him to make that trial; and if he kept the 50-pound weights on the ends of his belt, he would find that it would take the same addition of weight to the one side to make the belt slip, as it did in the case of the 1-foot pulley. After making that trial, he can double the width of his belt, and if the same weights are put on (no matter which pulley), the same weight on one side, as in the first case, will make it slip—provided, always, that the belts are in the same condition.

Some five years ago I made quite a series of experiments in order to demonstrate the laws which control the transmission of power by pulleys and belts; the results were carefully noted by me at the time, for future reference, and I will give them to you in as concise a manner as possible. I hope they will prove as useful to your readers as they have been to me, and that they will cause more definite experiments to be made by those who have better means at their disposal than I had.

My first experiments were to determine the strain that leather and rubber belting, as well as lacing, would break at. These materials were subjected to a dead weight (*i. e.* no levers of any description), on a platform, which was also taken into account. The fastenings of the materials were such, that no part of their width was subjected to a greater strain than another, and if the fracture occurred near the fastenings, the experiment was not counted or noted.

Five experiments with leather belts, three-sixteenths of an inch in thickness, by one inch in width, gave a mean result of 552 pounds as the breaking strain of each; before breaking, their width contracted to about three-fourths of an inch.

Five experiments with leather belts, three-sixteenths of an inch in thickness, by two inches in width, gave a mean result of 1077 pounds as the breaking strain of each. Before breaking, their width contracted to about one and five-eighths inches, fracture commencing perceptibly at the edges, first appearing by many slight breaks on the skin side, which gradually widened until it broke at one of them.

Three experiments with leather belts, three-sixteenths of an inch in thickness, by three inches in width, gave a mean result of 1532 pounds as the breaking strain of each, contraction to two and three-fourth inches, fracture beginning as in former cases.

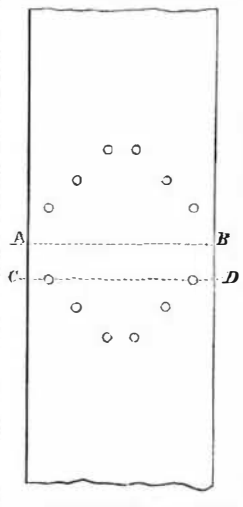
The rubber belting tried was cotton-filled and "three-ply" in thickness.

Five experiments with two-inch rubber belting gave a mean result of 1211 pounds as the breaking strain of each, did not contract in width perceptibly, and broke all at once, emitting a perceptible smell of rubber.

Five experiments with three-inch rubber belting, gave a mean result of 1763 pounds as the breaking strain of each—other items as before.

Experiments in great number were made with lacing, of various widths and thicknesses, but the results varied so much—no two being at all alike—and very much appeared to depend on the part of the skin from which the thong was cut. For instance, in some cases, a thong from near the back bone had four times the strength of that from other parts, so I could get no data that was worth noting.

The next experiments were made to determine the weakening effect of punching belts for the lacing, and the results proved that the belt was weakened to the extent of the sum of the diameters of the holes, if they were in a straight line across the belt.



The diagram here given will show the position of the holes in the belt which gave the very best results, as its cross section is only weakened by two holes at any place. A B was not cut, and C D was the invariable line of fracture, which first began at the edges, found assistance at the nearest holes to the edges, and continued across on the same line.

From these trials it can be seen that oval punches would be much superior to any other, as they would cut away less of the cross-section of the belt, and still give ample space for the lacing.

The next experiments were made with belts punched as in the above diagram, but cut through the line, A B, and then laced in a secure manner—results as follows:—

In leather belts, tearing began at the holes at five-eighths of the breaking strain, and continued on until the lacing tore out at the end holes, when the rest went suddenly.

In leather belts, after being subjected to one-half of the breaking strain for twenty-four hours, a slight addition to the weight caused them to tear at the holes, which, after commencing, proceeded rapidly, until the end holes tore out, when it went as before. After being subjected to one-half of the breaking strain for forty-five hours, it went as before stated. They stood one-third of the breaking strain for one week, and at the end of that time showed no signs of fracture.

In rubber belts, tearing began at one-third of the breaking strain. They stood one-fourth for twenty-four hours, but tore on a slight addition of weight. They stood one-eighth for one week without showing any signs of fracture. Eyeletting the holes brought the standing point up to the standing point of leather belting, the clinching of the eyelets on the cotton fiber or filling reducing the tendency to tear. I think that large oval eyelets would materially improve the fastening of such belts, particularly if the eyelets had large flanches so as to grasp or confine the material. They also operate well with leather belting, as their action is to distribute the strain all round the circumference of their holes, which is not the case without them, only a portion of the hole then receiving the strain. They likewise take from the belt the rubbing action of the lacing in rendering through the holes, which must have some effect on the portions in contact, as no belt can be laced so that the lacing will not render to some extent, saying nothing about the action of the same in the passage over pulleys, especially those of small diameter, where the action is continuous while in use transmitting power. My experiments with eyelets were not as satisfactory to me as I could have wished, as I was unable to carry them to any great extent, after so favorable results, on account of not being able to get them sufficiently large to take the lacing. I am confident that if I could have got them large enough, and of the right shape (oval), that I could have tested the belts up to very near their breaking strain, provided the lacing would have stood; and if it had not, I would have tried something else (catgut, etc.), until I found what would give first. As it was, the eyelets did not sufficiently bind the materials, although they gave much better results. I think that eyelets made expressly for the purpose would materially increase the duration of belting, as well as form a profitable article of manufacture.

I made no experiments with riveted belts, for two reasons:—1st. That it is a self-evident fact, that a riveted belt can be made much stronger at the junction than if the same were laced. Eyelets will act in a precisely similar manner, but only on one thickness of material, when used in conjunction with lacing; this was the reason I tried them. 2d. That all belts, being liable to stretch more or less from time to time, must have some portion of their length, which is easily accessible for the purpose of taking up the same, and as the usual and most ready means of doing this is by lacing, which is the weaker mode of fastening; then, the whole belt is liable to the contingencies of the same, and is therefore no stronger than that part, no matter how the other fastenings are made in its length. From these facts it can be be seen that, as a matter of self-instruction, which was my object, experiments made with riveted belts would be money, time, and considerable labor thrown away. ROBT. G. CARLYLE.

Virginia, Nevada, May 10, 1866.

[To be Continued.]

Trouble With an Air Furnace.

MESSRS. EDITORS:—We manufacture malleable cast iron, and use an air furnace with smoke-stack about sixty feet high; but in warm, cloudy weather it does not draw good, or at least we cannot melt more than half the quantity we can in cold, clear weather. The opening or inside of the smoke-stack is square.

Would it draw better if the opening or inside was circular instead of square as it is now? Would it draw better, that is, melt quicker, if the stack was higher? if so, how high should it be? Lastly, if we were to build a furnace the same as we now use and attach a blast to it, would the iron be as good as that made with the regular air furnace (or natural draft?)

THOMAS DEVLIN.

Philadelphia, Pa.

A NEW museum has been projected in this city with a large capital, and John Banvard as president. The principal novelty in the exterior is that the brick is to be vitrified or glazed similar to the common brown pottery. This will give it a very brilliant appearance in clear weather and on moonlight nights

Breech-Loading Rifles.

MESSRS. EDITORS:—I have read with no little interest, the letter of your Washington correspondent on the "trial of breech-loading rifles for the army," and also your remarks on "breech-loading rifles for sportsmen," in No. 24, Vol. XIV. of the SCIENTIFIC AMERICAN.

It is always pleasant to find one's own opinions endorsed and confirmed, as I do in two or three points in the above articles. First, it was a great satisfaction to me to learn that the Peabody rifle received the preference in the trial at Springfield, as I have always considered it the best and simplest gun for the use of the ammunition to which it is adapted, and which it has been decided to adopt for army use. I have urged its merits upon every one who has asked my opinion for two years past, and in repeated instances, when new inventions have been sent me for trial, my reply has been, after examination: "It is not equal to the Peabody." The letter of your Washington correspondent gave me the first intimation of its success with the Army Board, and without any interest in the gun itself, I am greatly pleased with such a decided confirmation of my opinion. The gun has never been in the market, and is comparatively little known, but if manufactured for sporting purposes, I am confident it would supersede all others yet produced for the use of the copper cartridge. But notwithstanding this opinion of its merits, and without any denial of the excellence of that kind of ammunition for military use, I still say that the Maynard is the only breech-loader that comes fully up to my ideas of what is requisite in a sporting rifle. There would be no difficulty in finding plenty of backers to the bet offered by Mr. Bradley, among those who are familiar with its powers. I have witnessed and taken part in a great many trials of rifles, of almost every description, and I have never seen any better shooting done with any muzzle-loader that was fit for field service, than with the Maynard. I do not compare it with the unwieldy target rifles with telescope sights, false muzzles, etc., for those can never be available for sportsmen; but I can show targets made with the Maynard, of ten successive shots, at fifty yards, all within a circle of an inch diameter; ten shots, at 100 yards, within a three-inch circle, and sixteen shots, at 220 yards (40 rods), within a nine-inch circle, and I have never yet seen a better performance with a muzzle-loading sporting rifle. I have a letter by me from an experienced Western rifleman who ordered a Maynard rifle on trial, and reports: "I can beat any muzzle-loader I ever saw, weighing less than thirty pounds." And I have testimony to the same effect from many different quarters. No other breech-loader, that I have tried, is so invariably accurate, and this accuracy is undoubtedly due, as your correspondent was assured by Dr. Maynard, to the exact centering of the bullet, which is attained by his mode of loading the cartridge.

The objection which I find most frequently made to the Maynard rifle is, that it is too light, "seems too much like a pistol," etc. No man was ever more strongly prejudiced in favor of heavy guns and muzzle-loaders than I used to be, but later experience has convinced me that the power of using a light or a heavy gun, with equal efficiency, is a matter of habit. For many years I hunted with a rifle made by Dickson, of Louisville, Ky., in 1835, with a barrel 33 inches long, the gun weighing 14 lbs. I now do better shooting, and at longer ranges than I ever dreamed of attempting in those days, with a 20-inch Maynard, weighing six pounds. I have a barrel of 26 inches to fit the same stock, but I can do no better work with it than with the 20-inch barrel, and prefer the latter for sporting for convenience sake, as I sling it by a strap over the shoulder, and can bring it up to an aim without unslinging. Every one who has been used to a heavy gun will complain at first that he cannot hold a light one steady, but I know by experience that a little practice will enable one to do it, and any man who knows the importance of economizing weight on such expeditions as are made in pursuit of game worthy of the rifle, will appreciate the difference on a long days's tramp between six pounds and ten or twelve, in the weight of gun.

The targets I have named afford sufficient proof of accuracy for sporting purposes. Every one of the ten shots at fifty yards would have taken a squirrel's head, as those at a hundred would have taken a patridge, and at forty rods would have been good for a deer and the sportsmen are rare who would attempt any thing better at those ranges.

Can you give any satisfactory explanation of the bursting of guns at the muzzle with ever so slight a stoppage? I have seen a very strong barrel split for an inch from the muzzle, simply from having a little light snow in it, which the owner of the gun thought could be easiest cleaned out by firing the gun; and I could tell you of some experiences of the same kind which are so surprising as almost to make one doubt the evidence of his own senses; but I am not sure that I have not already trespassed too long and will venture no further. C.

Danvers, Mass., June 22, 1866.

[The information sought for by our correspondent in regard to the bursting of guns at the muzzle, cannot now be given, but we would be glad to publish his experiences on that subject.

Magnetic Electricity.

MESSRS. EDITORS:—The new era in magnetic-electricity, so clearly predicted by Prof. Page, seems to have already dawned in a brilliant manner, and in its light the whole field of electrical science will doubtless unfold to us many of its hidden treasures. The wonderful magneto-electric machine, described in your paper of June 23d, of Mr. H. Wilde, of Manchester, England, is a realization of the proposition made by Dr. Page in *Silliman's Journal*, in 1839 (Vol. XXXV., page 252), at a time when the magneto-electric machine was hardly known. After indicating a way of increasing its power without limit by "multiplying the pairs of magnets," he says: "Nothing but the want of means has restrained me from erecting a magneto-electric machine, which I feel confident would rival the largest galvanic battery in existence." Again, in the preliminary Patent Office Report, for 1863, after summing up the achievements of the magneto-electric machine, he remarks as follows:—"From these and other cursory observations of the recent developments of magneto-electricity, flattering promises rise up in the contemplation of its future. The steam engine is hardly eighty years old, and the magneto-electric machine hardly thirty. It is only about forty years since the steam engine was fairly appreciated, and hardly a decade since the magneto-electric machine was duly recognized in the family of practical mechanics, and if its future career should be commensurate with its past, it will take high rank among the great engines of human progress."

One of the most extraordinary feats of magnetic electricity was witnessed in Washington a few days since, in the simultaneous explosion of forty torpedoes by one little magneto-electric machine not more than a cubic foot in its dimensions. The experiment was conducted by Tal. P. Shaffner, with a view to exhibit his improvements in artillery mining. The simultaneous firing of charges is a feature of incalculable value in mining; and although the assertion of Col. Shaffner, in his programme, that he is confident of firing a "thousand charges at once," seems very extravagant, yet, after the successful explosion of 40 charges with his little machine, what may we not expect in this line of progression when Wilde's improvements are introduced and the magneto-electric machine carried to its highest degrees of development? LADAN.

Let Americans use American Tools.

MESSRS. EDITORS:—Believing you are ever ready to advance the interests of the mechanic, I wish to say a few words through the SCIENTIFIC AMERICAN, in relation to watchmakers' tools. All the tools now used by us are imported—Swiss or English—and of very poor material and imperfect. It is impossible to obtain a good set of tools at any price. Now I wish to suggest that some enterprising Yankee go into the business, make himself rich, and watchmakers happy.

We have some splendid dentists' tools made in this country; why can't we have watchmakers' tools also?

Let some one make us a good, nice lathe, with drawing-in spindle, split chuck, etc., of some fine composition; make us a nice thing, and we will pay We also want pliers of all kinds and styles, tweezers etc., all thoroughly made, well finished, and fine temper.

This is the best chance for a smart mechanic to make his fortune, and we and our children will "rise up and call him blessed." "LYCURGUS."

St. Johnsbury, Vt., June 25, 1866.

Corrosive Action of Lead on Iron.

MESSRS. EDITORS:—The scientific man and others interested or curious can see the effects of contact of two metals, iron and lead, by examining three flights of stone stairs on the Front-street side of Fulton market. The steps are of brown stone, flanked by an iron balustrade on either side. The newel posts are iron, 1·5 inches square, and the balusters, also of iron, are 1 inch square. These are all inserted at the lower end in the stone and secured by casting lead around them in the usual manner. The upper ends are secured to an iron rail, the upper ends of which are secured to a brown-stone pillar in the same manner, the lower end to the newel post. On the top of the rails is riveted a narrower strip of iron, flat on the side in contact with the rail, the outer side rounded to make a finish.

The lower ends of these balusters, just above the junction with the lead, are, for an inch or two, reduced to a quarter of an inch, and many of them are entirely corroded or cut off, while above they are entire. Some of the newel posts, in the process of being destroyed, have, by the products of dissolution—being increased in bulk beyond the original diameter—burst the stone and now are free.—The top ends are entire, but the rail to which they were secured has suffered a great depreciation of its bulk. This seems to have taken place between the two plates of iron where they were riveted together. Here, also, we see the force of the increased bulk of the products of dissolution, as we find that the rivets are mostly withdrawn. In some that are not, we find that the mass of oxide (or whatever it may be) has forced up the top plate some three-fourths of an inch, and is there held as in a trap. The rails, where they are joined to the stone pillars, seem not to have been reduced much.

I send you a piece of one of the balusters, which you will see, was entirely cut off; though, as you will notice, it is of good fibrous iron. I also send you some of the products of the dissolution, which I forced off the iron.

The above are some of the phenomena as seen by an unscientific eye. The scientific observer would undoubtedly see much more. It would be an interesting fact to know, how long it has taken Nature to do this work. It would indicate that lead is not a good material to secure iron to stone.

Query: Is brimstone liable to the same objections? F. W. BACON.

84 John street, New York.

Long Feed.

MESSRS. EDITORS:—I write to mention a plan of preparing "long feed" for horses and cattle, which does not seem to be generally known. It is made of dry straw and green clover, and in this manner: Lay brush or poles for a stack; spread the fresh-cut clover a foot thick; on this lay the straw a foot thick, and so on, in alternate layers, until the stack is made. The juices, gases, etc., from the clover will so thoroughly permeate the straw as to prevent the clover from "firing," and make both equally good food for stock. Cattle will eat the one as readily as the other. Not only is there saving of time, etc., by the operation, but also of all those valuable parts of the clover lost in the process of drying.

J. P. LITTLE, M. D.

Richmond, Va., June 13, 1866.

[We have no doubt that this plan will make an excellent feed, and in some places where straw is abundant and cheap it will utilize what is now wasted to some extent. In this section, however, the demand for straw in the manufacture of paper is so great that it commands a higher price than hay.—EDS.

Professor Abel found that hardened steel wire dissolved in hydrochloric acid without residue, whereas, the same steel in the softened state yielded by such action a dark flocculent carbonaceous residue

How to Find Variation and Attraction of the Mariner's Compass.

MESSRS. EDITORS:—You will much oblige your humble servant by giving the following a place in your useful columns, for the benefit of mariners at large:—

A New Mode for Finding the Variation and Local Attraction of the Mariner's Compass.—Take an ordinary compass-card and erect upon its center a fine copper wire, from four to six or eight inches in hight, and perpendicular to its plane, at the moment of the sun's meridian passage, as indicated by the noon observation for latitude, note the direction of the shadow cast by the wire on the compass-card. The angle contained between this direction and that of the north and south line of the card, will give the variation and local attraction combined. Small errors are involved in this method, but the approximation is close enough for the purpose for which it is intended. MARINER.

Naval Academy, Annapolis, Md., July 3, 1866.

[The above communication was sent to us by a well-known commander in the navy, and the information given is no doubt correct.—EDS.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees:—

ROW-LOCK.—CAPT. J. W. NORCROSS, Middletown Conn.—This invention relates to a row-lock which is mounted on a wooden bed plate and composed of metal sockets with wooden thole-pins, in such a manner that the row-lock can be sold ready mounted, and all the boat-builder has to do is to fasten the bed plate down to the gun wale of the boat, the metal portion of the row-lock with the thole-pins being secured to the bed plate so that it can be easily fastened or unfastened, thus enabling the owner of a boat to take off his row-lock when the boat is laid up ashore, and to attach the same at a moment's notice if the boat is needed for use.

CORN CULTIVATOR.—C. W. TALIAFERRO, Keittsburg, Ill.—This invention relates to a corn cultivator plow, and it consists in a novel construction of the same, whereby the plows may, with the greatest facility, be adjusted both vertically and laterally, as may be required, and a strong and durable implement obtained.

BRUSH.—R. P. GILLETT, Sparta, Wis.—This invention consists in arranging within a suitable frame, a series of parallel layers of bristles, broom-corn, or any other material ordinarily sed for brushes, with a cross block or piece between each layer, which layers and cross blocks are secured together by bolts and nuts in a novel and peculiar manner.

QUARTZ CRUSHER.—JOHN T. BONNELL, Columbia, Cal.—This invention relates to that class of quartz crushers which are provided with rising and falling weights, pounders, or stamps, and it consists in a novel and improved means for operating the weights, pounders or stamps, whereby the machine may be worked by hand with a very moderate expenditure of power.

BRIDGE.—DAVID HAMMOND AND W. R. REEVES, Canton, Ohio.—This invention relates to a novel construction and arrangement of cast-iron arches, king and queen posts, and wrought-iron string pieces, etc., in such a manner as to insure a light, strong and durable bridge.

WINDOW SASH FASTENING.—H. DE BAUN, Paterson, N. J.—This invention consists of a latch attached to one side of the window sash, in combination with a rack attached to the window frame, in such a relative position with the latch that the latter may catch into the rack, and thereby support the sash.

SHEEP-FEEDING RACK.—M. S. EVERY, Bridgewater, Mich.—The object of this invention is to so construct a sheep-feeding rack that the same may be used for feeding out either hay or grain.

STEAM TRAP.—T. M. FORCE, Norwich, Conn.—This invention relates to a novel construction and arrangement of the trap whereby efficiency and reliability of operation and simplicity are secured.

POCKET-BOOK PROTECTOR.—CHAS. H. BAGLEY, Elgin, Ill.—This invention relates to a mode of securing a pocket-book, memorandum book, bill holder, or the like, in a person's pocket, in such a manner as to frustrate any felonious attempt to abstract the same but, at the same time, which will not hinder the owner of the pocket-book from withdrawing it whenever occasion requires.

BEE PASSAGE AND PROTECTOR.—JAMES WASH, Mount Sterling, Ill.—This invention is designed to protect bees from the moth by preventing their entrance into the hive, and to this end the invention consists in the employment or use of a tube applied to the hive in such a manner that the entrance will be at some distance from the hive, and having the latter provided with decoys composed of openings covered with wire gauze, these openings being directly over vats or receptacles supplied with grease or any substance which destroy the millers as they drop into it.

INSECT PROTECTOR.—SAMUEL CLARK, New York City.—This is a device for protecting bedsteads from bedbugs and other crawling insects. It consists in placing a thin band or annular pendent projection within an united cup-shaped base, one being provided for each leg or foot of the bedstead to rest upon, so that the bugs cannot pass from the floor up the legs of the bedstead.

BLACKSMITHS' FORGE.—JAMES PATTERSON, New York City.—This invention consists in having the bed of the forge upon a hollow base provided with a perforated valve, and having the nozzle of the bellows entering it, whereby the hollow base is made to perform the double function of a wind chamber and an axle receptacle, and two important results attain—an uniform or even blast supplied to the fire—sudden gusts or puffs, being avoided—and ashes, dross, etc., very readily abstracted from the fire whenever necessary.

CARRIAGE DOOR HINGE.—GEORGE W. BEERS, Bridgeport, Conn.—By means of this hinge the carriage door may be securely attached to the side of the door way, and yet be readily removable when desired. The invention consists in the combination of plates and a catch with the swinging arm of an ordinary concealed carriage door hinge, and with the edge of the door.

BROOM HEAD.—JOHN H. LIGHTNER, Shirleysburg, Pa.—This invention consists principally in attaching toothed bars to the inner sides of the cap; in hinging a portion of the sides of the cap to its upper part; and in securing the parts of the broom head to each other and to the corn by a band slipped down over the broom head for that purpose.

NAILS AND TACKS.—RACHEL SPEER, Passaic, N. J.—This invention relates to that class of fastening by which two or more articles or pieces of any material are secured to each other by driving the fastening through them.

LOCK FOR MAIL BAGS, CARPET SACKS, ETC.—JOHN B. LOGAN, Thornton, Ind.—This invention consists in a peculiar arrangement of bolts and catches, whereby a rapid opening and closing of the bag or sack is insured, which, when locked, will be secure and reliable.

OILER.—GEORGE J. CAPEWELL, West Cheshire, Conn.—This invention consists in providing an ordinary spring-bottom oiler with a tube extending from the nozzle to near the bottom of the oiler, where it has attached to it, by a swivel joint, another tube nearly at right angles with it and turning by its own weight in a plane parallel to the bottom, so that the end of it is always near the side of the can which is lowest.

WATER ELEVATOR.—J. C. BARRETT, Stamford, Conn.—This invention consists in a novel application of the "lazy tongs" system of levers for elevating water for domestic use, and it consists in the means employed for actuating the system of levers and in the means for tilting the bucket.

SCREW WRENCH.—A. M. OLDS, New York City.—This invention consists in the arrangement of a spring tooth bearing at one end against a shoulder of the movable jaw of a screw wrench, and at the opposite end against the shank of the wrench in such a manner that if an attempt is made to slide the movable jaw down, the spring tooth catches firmly between its bearing points and the jaw is locked; but in moving the jaw toward the stationary jaw the spring tooth is released and permits this motion without obstruction.

CHURN.—EDWIN HOYT, Stamford, Conn.—This invention consists in a novel device for holding the dasher rod while being operated, whereby it can be quickly released for removing the dasher from the churn; and it also consists in a novel construction of the dasher whereby a better effective power is obtained for agitating the cream.

CANE-JUICE EVAPORATOR.—JOHN F. RIGGS, St. Joseph, Mo.—In this invention the evaporator pan is made of cast iron and arranged with ledges or flanges protruding from the sides alternating so as to form a transverse channel.

STAMP MILL.—ALEX. HERDLEIN, Egan Canon, Nev.—This invention consists in the arrangement of double-armed levers, the long arms of which are about ten times longer than their short arms, in combination with the stamper and with suitable cranks or eccentrics on the driving shaft, in such a manner that, by the assistance of the double-armed levers, the operation of raising the stamper is facilitated and the number of blows of each stamper can be increased almost to any desired number per minute without danger of having the wipers come in contact with the descending tappets.

TOOL FOR FINISHING AUGER HEADS.—RUSSELL JENNINGS, Deep River, Conn.—This invention consists of a rotary wheel of a peculiar shape, whereby the workman is enabled to apply the auger to the wheel and manipulate the former in such a manner that all parts of its cutting portions, necessary to be operated upon, may be brought in contact with the tool and the work performed in an expeditious and perfect manner.

HEAD BLOCK.—C. LEFFINGWELL, Clarksburgh, Ohio.—This invention consists in the construction and arrangement of the pawl blocks, and the combination of the rods, levers, and racks, by means of which the knees of the head blocks are worked with each other, and with the movable pawls.

TABLE-LEAF SUPPORT.—L. R. CAVENDER, Eureka, Ill.—The object of this invention is to furnish a simple, convenient, and safe support for a table-leaf. It consists in the combination of a pivoted arm, a spring, and a cord, with each other, and with the frame of the table.

SHIP'S WINDLASS.—JOHN S. GETCHELL, Machias, Me.—In this improvement the ship's windlass may be worked with increased power, or increased speed, as desired, and it consists in the combination of two sets of single or double pawls and bent-lever stops with each other, with the ratchet wheels of the windlass, and with the operating levers.

CULTIVATOR.—A. M. BLACK, Auburn, Ill.—The object of this invention is to provide a frame-work and operating movements which have the qualities of great simplicity, cheapness, and efficiency.

HEATER.—NATHANIEL A. BOYNTON, New York City.—This invention relates to that class of stoves which are commonly called heaters, and it consists in providing a novel course for the products of combustion on their way to the exit flue.

GATE.—CHAS. DIXON AND S. H. CLOSE, Port Byron, N. Y.—This invention consists especially in the construction and combination of the spur wheel, shaft, and bevel gear wheel, so that the first effect, upon operating the levers, is to unlatch the gate, and the second effect is to swing it open or shut.

MILK RACK.—ALBERT JACKSON, Clifton Springs, N. Y.—This milk rack is so constructed as to afford a sure support for the milk pans, and to guard against their slipping off when the rack is revolved; and it consists, principally, in the combination of ring guards with the supporting arms and wires

PLOW.—T. E. C. BRINLY, Louisville, Ky.—This invention consistsin constructing the mold-board with a point having a hook or shoulder at its under side to fit over the front end of the land side, whereby a smooth, unbroken surface is obtained at the upper side of the mold-board, and no opportunity allowed for weeds and trash to catch and collect on the point. The construction of the plow is also much simplified.

Notes and Queries

C. C. H., of Mass.—The velocity of water in falling is the same as that of other falling bodies. One pound of water in falling one foot would do one foot-pound of work if all its power could be utilized, and no lever or other device can make it do any more. Practically the best turbine will utilize 91 per cent of the power, good breast and over shot-wheels, between 70 and 80 per cent. It is always best to take the power o a breast wheel from the circumference. With gears, pulleys, and other mechanical devices, it is an invariable law that what is gained in power is lost in speed.

A. J. T., of Ohio.—Breast wheels are generally run with a velocity at the periphery of six to seven feet in a second

W. P., of N. Y.—The lateral pressure of water is a little more than half a pound per square inch for each foot in depth, being 15 pounds at the depth of 34 feet. We should make a dam like yours 13 feet thick at the bottom, and lay the upper side in cement to a thickness of 2 feet.

G. W. P., of Conn.—By turpentine varnish in the laquer receipes is understood copal varnish diluted with spirits of turpentine.

F. M. L., of Pa.—It would seem to be a simple matter to regulate the rise and fall of the weight by a governor but from the incomplete description you give it is hard to form a proper opinion.

J. E. B., of Mass.—You understood us precisely—we did not mean to ridicule the question. In regard to the question, "Which is the mother of the chicken, the one that lays, or the one that hatches the egg?" we refer you to Ralph Waldo Emerson.

S. W. W., of S. C.—Rosin is bleached by melting in a suitable vessel at a temperature of not more than 600 deg and passing steam through the fluid mass. The steam and rosin are then condensed in a receiver and the product dried. Carbonic acid, or a mixture of carbonic acid and nitrogen or hydrogen gas, are introduced sometimes, to perfect decolorization. Rosin oil is one of the products of destructive distillation of rosin, the residuum being tar.

J. M. M., of Conn.—We are not aware that Arago's plan for proving the theory of light, has been tested. The undulatory theory is becoming recognized and accepted. The calcium light is not polarized. We cannot tell whether laying a razor aside for some months will restore its quality of holding an edge or not. The experiment can be tried.

A. B., of Mass.—Your transfer ink, judging from your description, is probably a lithographic ink, composed of tallow, wax, and soap, each 4 oz., shellac 3 oz., gum mastic, 2½ oz., black pitch 1½ oz., and lampblack. To your inquiry: "does a piece of cloth colored with an aniline dye fade on exposure to sunlight?" we reply, that much depends on the nature of the fabric. Silk or woolen will retain an aniline dye very well, but cotton, being a vegetable, must be albumenized or animalized to receive the aniline. Sunlight affects these dyes more than madder and some other dyes.

J. S. R., of Pa., asks if there is such a thing as a suction fire engine, how far it will supply itself, and where it can be got, and the price? There was a time when the tank of fire engines were filled with buckets by hand, but they have gone the way of the hand-card and old fashioned spinning wheel. All fire engines, hand and steam, are now built to elevate their own water by what is commonly called suction that is the elevation of water by atmospheric pressure in a vacuum. The supply keeps pace with the delivery through the forcing pipe.

R. N., of Nebraska.—The only receipe we know of for restoring burnt steel is to work it repeatedly at a low heat and even that won't do sometimes.

K. R. P. of Ind.—When the furrows are laid off in a mill stone, the miller strikes a circle near the eye and another near the verge of the stone, he then draws lines from the circumference of the small circle to points on the large one, the angle, or, more properly, the lead of these lines, constitutes the draft of the furrows.

T. G., of Canada.—Your proposition in hydraulics is not of sufficient general interest to warrant its publication It would better suit the columns of *Silliman's Journal*.

I. C. T., of Del.—Refer to Vol. XI., pp. 295 and 373 for rule to find gears for lathe screw cutting. We have published this rule so many times we dislike to produce it again. You will find a hint also in our reply to T. R., Sing Sing in No. 26, Vol. XIV., page 429.

SPECIAL NOTICES.

L. C. Q. Wishart, of Philadelphia, Pa., has applied for the extension of his patent for ornamenting bottles. The petition is to be heard on the 8th of October next.

Lorenzo L. Langstroth, of Oxford, Ohio, has petitioned for the extension of a patent granted to him on the 5th day of October 1852, and reissued on the 26th of May, 1863, for an improvement in Bee Hives. The petition will be heard on Monday the 17th day of September, 1866.