Editorial Summary.

THE STEAM GUN CARRIAGE.—A further trial of Mr. Ead's gun carriage was made on the 18th ult., in the presence of Admiral Farragut and a number of high officers of the army and navy. Twelve shots were fired (with the 15-inch gun) in exactly 16 minutes. The steam shot-elevator had been deranged in some manner, and was not used: in consequence of which, the inventor thinks, the firing was not more than half as rapid as it might have been. The steam check to the recoil was tested with a number of heavy discharges, one man controlling the gun with ease. The pressure created in the cylinder by the heaviest charge was between 750 and 800 lbs. to the square inch. The heating of the gun with this rapid and heavy firing, was very slight—an important and rather unexpected result. The interior surface, as far as the arm could reach, was barely warmed, and the exterior seemed as cool as before. Greater confidence is now felt in the endurance of these great guns, than ever.

EARTH WORMS.—Another correspondent adds the testimony of his own observation, to the curious mode of eating grasses and leaves, detailed in a communication which our readers will remember. He adds one or two curious observations further:—"The worm exudes a transparent, sticky substance, which serves it for taking hold on objects to be conveyed to its hole, and also as a means of finding its way back to the hole, by the slimy trail. Although the worm cannot see, it can hear very well; a very moderate noise at the distance of three feet causing it to contract and attempt to hide. It would also seem that the worm is very sensitive to warmth. With a small stick I could touch it before it was aware of anything being near it: but in cautiously putting my hand toward a worm, it would contract its body when my finger was an inch from it. It would seem from this that the warmth of my hand made the worm aware of its approach."

THE COMMON SNAIL, which seems like little more than a jelly, is furnished with quite a firm jaw of a crescent shape, on the upper lip. In some species this jaw has a slight smooth projection on the cutting edge, and in others it is notched. It is capable of biting through the leaves of lettuce or cabbage, and when feeding, the nipping sound of the bite can be heard, and the little semicircular cuts on the leaf are distinctly seen. But the more curious part of the eating apparatus, is the tongue with which the snail laps its softer food, and which is also furnished with sharp, hooked, rasping denticles to the incredible number, in some species, of nearly 12,000, arranged in regular longitudinal and transverse rows, on a bit of membrane not a quarter of an inch long and half as wide. A wonderful vitality is found in these creatures for reproducing portions cut away, and sometimes even the head grows again after decapitation.

COPPERING IRON HULLS.—A correspondent calls attention to Barnard's (American) patented mode of coppering iron hulls, by means of rivets headed in a chamber reamed out within the thickness of the iron with a one-lip drill: the sheathing being laid in a patented insulating paint and cement. He states that Mr. Barnard went to France in 1864 at the instance of the Government, to superintend the sheathing of one of its iron hulls in this way, and asks if we have not confounded Barnard with Bernabe. By referring to our original notice, it will be seen that Bernabé's patent is even more distinct from Barnard's than his name: being of the kind the French call *galvanoplastique*, and relating to the chemical precipitation of copper upon iron.

MISCELLANEOUS.—Americans in China have secured for American steamboats the exclusive use of two of its rivers. The British there cannot furnish the equal of our boats in speed, and so have been shut out, which has awakened quite a breeze.——An ordinance for paving a portion of Seventh Avenue, New York City, with the Stafford (wooden) pavement has been passed by the Common Council. The Mayor's decision is reserved.——The first steam fire engine in China arrived there in March last, and does so well that more are about to be ordered.——The population of London is estimated by the Registrar General at 3,082,372; Liverpool, 492,439; Manchester, 362,823; Birmingham, 343,948.

GREAT ESTABLISHMENTS.—The French have a notable genius for mammoth incorporations in manufactures as well as finance. Their great industries are consolidated in fewer and vaster establishments, relatively, than in any other manufacturing country. The celebrated works of Schneider & Co., Creusot, turn out one eighth of the whole iron product of France, and employ 10,500 workmen. Chatillon yields one twelfth, with 8,900 workmen; Petin, Gaudet & Co., a still larger proportion, with 7,000 to 8,000 men.

THE PRUSSIAN Navy is set down by a French journal at 78 ships carrying 453 guns; two being iron clad. But British builders are now making for Prussia at least three powerful plated ships of war. Mr. Reed, chief constructor of the British navy, who furnished the model for the Wilhelm describes that vessel as the most powerful ever laid down in any country. She is nearly 6,000 tuns burden, with 1,150 nominal horse-power, and has iron armor plating 8 inches thick.

NEW WAY TO MAKE POTASH.—A process hitherto confined to the laboratory, has been introduced on a practical scale by M. Tessié de Mothay, advantageously replacing sulphuric by fluosilicic acid in the manufacture of potash. The acid is obtained from carbon, silex, clay, and fluoride of lime, melted in a blast furnace.

INDIUM.—This new and scarce attainable metal has been produced in decidedly perceptible quantity by M. Reichter, who first succeeded in isolating it. M. Reichter lately presented to the Paris Academy of Sciences two prism-shaped specimens of indium, about four inches long, with sides one-half and three-fourths of an inch wide. It is obtained in faint traces, in a precipitate derived from the solution of zinc in sulphuric acid. Its presence in zinc and its close resemblance to cadmium, which also accompanies the ores of zinc, have led to the conjecture that these two obscure metals are the same. The distinctive traits of indium, however, leave no doubt upon this point, its only known oxide, unlike that of cadmium, being insoluble in ammonia, and its spectrum being distinguished by a bright indigo ray. Its color, smell and other properties somewhat resemble those of tin.

SELLING OFF THE IRON CLADS.—The money articles inform us that ten millions of francs in foreign exchange made their appearance in our market the other day, in completion of the purchase money of the *Dunderberg*. With the preceding instalment, it is understood the builder realizes something over $3,000,000 currency.—It is also understood that the French Government has completed the purchase of one of our smaller iron clads, now in European waters, and that five million francs further will presently rejoice the heart of Wall street.—The Japanese Commissioners, it is reported, are to purchase the ex-rebel iron clad ram *Stonewall*, if a survey proves satisfactory, for $400,000.—Finally, it is rumored that Russia takes the *Miantonomoh* and a few other unconsidered naval trifles, on general account. We have a few more left for prompt applicants—"selling out to make room for new stock."

——We regret to observe that the prize of $20,000 offered by the French Academy for a solution of the nature and remedy of Asiatic Cholera, has not been won. A nnmber of gentlemen were awarded partial prizes for valued contributions to the object.——Philadelphia boasts the largest music hall on the continent. Horticultural Hall, just opened, measures 75x 200 feet, giving 15,000 square feet of floor. The Boston hall has 10,206 square feet, Irving Hall, New York, 9,375, and Steinway Hall 9,125.

GLASS PRINTING.—De Mothay has prepared an ink for printing on glass by means of rollers similar to those used in calico printing, after which the glass is subjected to heat and the picture is vitrified and fixed in the glass, without producing any distortion or imperfection. Many thousands of plain patterns and mosaics of stained glass produced by this process at a very cheap rate, are already in use for the decoration of church and other windows. The colors are mixed with a solvent of a silicate or silico-borate of potash and lead, as usual in painting on glass, and this composition rendered plastic by resin in turpentine, is applied thickly to the rollers and transferred to the glass, after which it it is vitrified in the usual manner.

FLAT STREET RAILS.—The obstinate prejudice of the English against street railways. leads to a discussion at present of a compromise plan. It is proposed to lay two pairs of nearly flat rails with a slight depression centrally for omnibus wheels, and a guide rail midway for the driver to sight with the pole of his carriage, so as to keep the track. The suggestion is not new, but it is worthy to be thoroughly tried and perfected. We shall not have the perfection of city travel, until a public roadway free to all, to which ordinary vehicles may be adapted, offers no resistance to the movement, turning out and passing of conveyances.

PHOTOGRAPHY IN 1787.—In a book printed in 1787, entitled "Rational Recreations in Natural Philosophy," by W. Hooper, M. D., occurs a paragraph headed, "How to print letters by sun light." The directions given are, to fill a glass decanter with a solution of silver, mixed with chalk and aquafortis of the consistency of milk. Then having pasted paper models of the shape desired, on the outside of the decanter, and placed it in the sun, the glass will turn black, leaving the space occupied by the paper white. In 1802, the action of light upon silver salts was applied to producing images of leaves, lace. etc., on white leather or paper, by Wedgewood and Davy.

A MONUMENT TO PROFESSOR BACHE is projected at Washington, and a committee, including his successor, Prof. Peirce, Prof. Henry of the Smithsonian Institute, Admiral Porter and other distinguished gentlemen, are moving in the matter. The Boards of Trade in the seaboard cities, realizing the obligations of commerce to the man who made the Coast Survey what it is, are coming forward to second and promote the proposal, which will no doubt be promptly and properly carried out.

CONCILIATION.—A clergyman's mode of rat catching as described in an exchange, is worthy the attention of Mr. Henry Bergh. He uses a wire cage trap, and when a rat is caught, instead of incontinently killing him, he treats his prisoner liberally with food and drink, until he is fat, tame and contented. Others will then crowd in to share his good fortune, (if he is not large enough to drive them away) and may be removed at leisure and despatched.

THE THIRD ANNUAL EXHIBITION of the Middlesex Mechanics' Association will be given Sept. 10, 1867 at Lowell, Mass. For further information address Hocum Hosford, Superintendent, at the corner of Middle and Shattuck streets Lowell, Mass.

THE ADDRESS of Lamb Cook & Co., manufacturers of Oliver A. Kelley's water wheel governor, illustrated in No. 19, current Vol., page 296, is at Slatersville, R. I.

A Dam Built in Midwinter.

Among recent engineering operations, the construction of the dam at Turner's Falls, Mass., on the Connecticut river, in the depth of winter, is somewhat interesting. The channel being divided by an island, the work, a dam of 23 feet in hight and 900 feet in length, was built in two sections, one after the other; an opening twelve feet lower than the dam and 200 feet wide having been left in the middle of the first section, for the passage of the current while the second section was building. But before the second section had been completed (which was done by the middle of December last) a freshet brought down a raft of timber against a wooden barrier erected to guard the opening left in the first section and to facilitate finally closing it, and sweeping away this structure, tore out the foundations of the dam below the opening, down to the bed rock, for a breadth of about 110 feet.

This breach must be repaired at once or the whole remaining work was liable to be swept away by a freshet at any time in late winter or spring. The ordinary flow of the river through the breach was 5 to 8 feet deep, with a velocity of 10 to 12 feet per second, and a volume as estimated, of 5,000 to 10,000 cubic feet per second. To turn the water out of this channel, that the masonry might be laid in its bed, a provisional dam was constructed of timber cribs, bearing against the stream in the form of an arch, and spanning horizontally the breach. The first crib or pier was towed into position on the 31st of December, and sunk by filling with stone. Ten such piers were placed at equal distances, ends against the current, as radii in a segment of a circle, and the last was in position on the 16th of January, 1867; the current still flowing freely between them. The passages were now to be closed by a second set of piers, tapered to fit the convergence of the first set, and serving at once to key and fill the arch, which then presented a front to the current only consolidated the more, the greater the pressure brought against it. The last of these plugs was put in on the first of February. Nothing remained but to fill in and tighten the barrier, after which the dam was laid in perfect security, commencing March 1st and finishing on the 22d of that month. The work of filling in was interrupted by high water for a few days in the middle of February, and two piers had been lost while floating them to their places, by the breaking of guys: but with these exceptions no mischance occurred, and notwithstanding the severity of the season and the arduous nature of the work, no loss of life, personal injury or unusual sickness was suffered among the seventy men employed. Both the process and the result reflect great credit upon the agent, Mr. Geo. W. Porter, and the superintendent, Mr. A. P. Richardson, who jointly devised and managed the plan.

Amber.

Amber is found on the southern shore of the Baltic, where it isc ast up by the action of the groundswell after the northerly gales. It is also found on the coast of Sicily, on the Adriatic, on the English cost Norfolk and Suffolk, and at Cape Sable, Maryland. Mining for amber in beds of brown lignite is carried on in Prussia, and it is found in excavations all over Europe. Still amber continues to be the "gem of the sea," by which it is yielded only after a storm, and in such small quantities that its value has ever remained undiminished.

Amber is found in masses, irregularly shaped, and usually of small size. The color is of all shades, from a pale straw to deep orange. It is brittle but can be easily cut with a sharp knife, it is the opinion, and is only an opinion that it is simply an exhuded vegetable juice. Baron Leibig thinks it probable "that amber is a product of the decay of wax, or of some other substance allied to the fixed oils." Sir David Brewster says that amber is an indurated vegetable juice. Wood, leaves, flowers, and fruit have been found inclosed in amber, and recognized as having belonged to coniferous trees now extinct.

Sicilian amber is usually of a deeper color than that from the Baltic, and it is said that in Germany an experienced amber worker can determine the locality of amber from difierences in its appearance. Neither is it invariably found in a hard state. An instance is on record of a gentleman having received from a friend living on the Baltic coast a piece so soft as to take an impression of his seal; and another piece is described as soft on one side and hard on the other

The uses of amber are not very numerous. As a material for art carving nothing can be more beautiful. The principal market is Constantinople where it is made into pipe mouthpieces, and articles of female adornment in the shape of beads. The Turks and Armenians are said to be fine judges of amber, and the bazaar at Stamboul, where the amber workers are located, is full of interest to the connoisseur.

The only purpose to which it is applied in the useful arts is in the manufacture of varnishes for carriage builders and photographers. That used for carriages is expensive, and is a long time in drying, but it is the hardest and most invnlnerable of any known varnish.—*Providence Journal.*

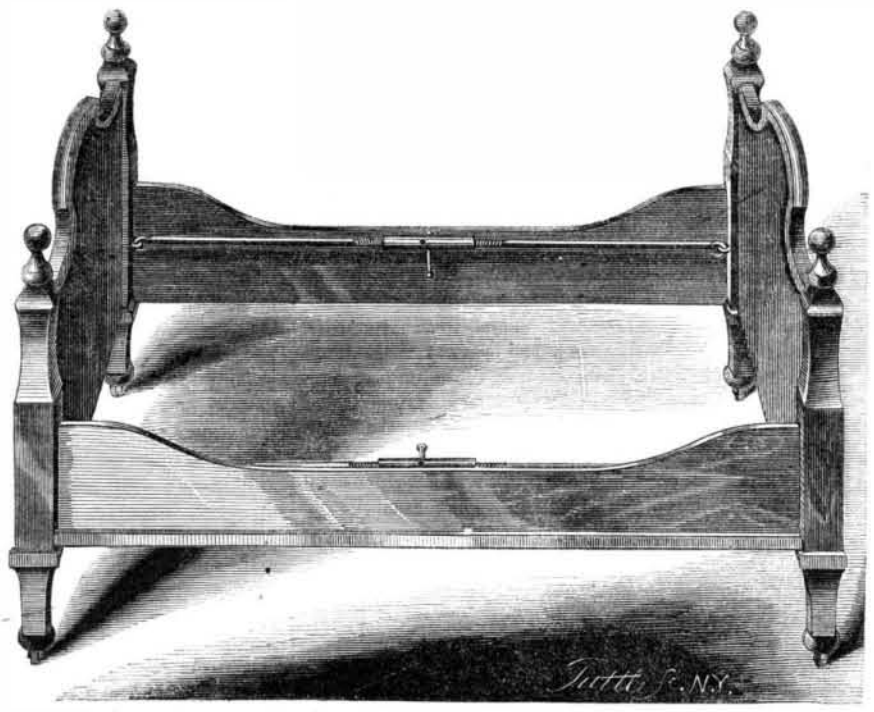
Crystallized by Concussion.

A circumstance apparently confirmatory of the disputed theory of a molecular change in iron from mechanical shocks, is related by a correspondent at Underhill, Vt. He says that an old relic of the Revolution, a French gun barrel, which had been refitted with new stocks and locks several times, after standing fire perhaps the millionth time, burst, and in such a manner that every one who saw it pronounced it to have been originally a cast iron barrel, until an old iron maker convinced them by showing the weld on the under side. But the appearance otherwise was exactly like cast iron, and brittle at that. Mr. E. attributed the change in the iron to the action of the sulphur in the powder and its long use and many times repeated action.

Improved Bedstead Fastener.

Bedsteads which are secured by means of screws offer great facilities for the hiding of the vermin which find their favorite retreats in the apertures thus left for their convenience. Various other methods of fastening have been devised, but where recesses are made in the posts or bars the bedbug is sure to ensconce himself, even if the crack through which he passes will scarcely admit a thin knife blade. The one shown in the engraving has all its parts exposed and does not require any mortising or boring of the wood. It is simply a double bar or rod on each side of the bedstead, inside the side pieces, the outer ends of which are formed into hooks which engage with staples in the posts, and the other ends of which are connected by a screw sheath. The end of one of these half bars is threaded with a right-hand screw and the other with a left-hand screw. The coupling has a lever, knobbed on each end, that passes through its center, by which the two rods are screwed up and the frame of the bedstead tightened. These rods also form a support for the ends of the slats, making a spring-bed bottom.

The device is so simple that no further explanation is necessary to convey a proper idea of its construction and operation. It was patented through the Scientific American Patent Agency, April 23, 1867. For further information address the patentee, George G. Cochran, 95 Powers street, Brooklyn, N. Y.

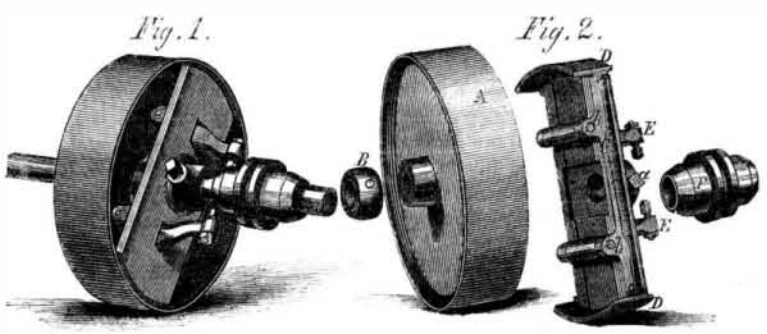


COCHRAN'S IMPROVEMENT IN FASTENING BEDSTEADS.

Improved Friction Clutch Pulley.

In almost every workshop much trouble and annoyance is occasioned by the derangement and noise of friction and clutch pulleys. While these difficulties may often be caused by defective workmanship, it is more frequentiy the case that the pulleys are of imperfect construction and therefore unfitted for long continued or constant use. A friction clutch pulley is shown in the engraving which it is believed will be found, both in principle and in execution, free from the almost universal objections existing in pulleys of this class.

Fig. 1 represents a complete friction clutch pulley in working position upon a shaft. Fig. 2 represents the parts of the same. A is a pulley, the inside surface of the rim of which is turned. This pulley revolves freely upon the shaft and is kept in position on one side by the collar, B, and on the other by the segment plate, C. The segment plate, C, is fastened to the shaft by the set screw, *a*. Attached to this plate and sliding in planed grooves are two segments, D D, which move in opposite directions at right angles to the shaft. The outer surfaces of these segments are turned to the same diameter as the inside of the rim of the pulley, A. The two levers, E E, are connected to the segment plate, C, by pins passing through them and the ears, *b b*, which act as fulcrums. These levers pass through and are fitted to the segments, D D, and also through the segment plate, C. In the outer ends of these levers are adjusting screws with set nuts. Fitted to and sliding upon the shaft is a thimble, F, the end of which is turned a conical shape. Upon the outside of this thimble is a groove into which a shipping fork is fitted. It will be readily seen that when the thimble is pressed forward toward the pulley the conical end comes in contact with the rounded heads of the adjusting screws by which the two levers, E E, are forced outward carrying the two segments, D D, which movement brings the faces of these segments into contact with the inside of the rim of the pulley, binding the surfaces together, and thus communicating the motion of the pulley to the shaft. This pulley is perfectly noiseless as well as simple and efficient, with no liability of locking or unlocking except at the will of the operator. Those interested can address the manufacturers, J. R. Brown & Sharpe, at Providence, R. I.



BROWN & SHARPE'S FRICTION CLUTCH PULLEY.

MAINE AND HER PUBLIC WORKS.

The remarkable vigor and unity displayed by the people of Maine in developing the great natural resources of their territory, point to a future of eminent—who knows but pre-eminent?—prosperity. We have occasion almost weekly to note fresh instances of manufacturing enterprise called into existence, and sometimes coming when called, all along the magnificent descents of her many streams, by the liberal votes of township after township. The state and township activity in railroads is equally noteworthy. All towns are allowed by law to take stock in railroads to the amount of five per cent of their valuation, beside special authorizations for larger subscriptions. This permits the whole property of the State to be taxed by town votes at least five per cent for the grand purposes of internal improvement. A very healthy and important characteristic of railroads built on this plan, is that so far they become public property—belong to those who give them right of way and are to use and support them—and are in the natural way to become what roads of all kinds ought to be, free highways.

The same privilege is granted to towns in the adjoining State of New Hampshire, and will doubtless operate powerfully there also upon the progress and ultimate destiny of the system of roads passing through both states in common. In Maine, however, these as well as local lines find their conception, and inception, and main impetus, and receive liberal exemptions from taxation, and direct subsidies, at the hands of the State.

In 1860, says the *Railroad Journal*, the total length of railroad within the state was 472 miles, costing $16,576,385. In 1866—less than two years later, leaving out the war—the miles were 509, beside the Portland and Montreal line from the state boundary to Island Pond, 71 miles, built entirely by Maine capital, and the total cost (correcting the *Journal's* misprints) was $22,104,845. This resumption of progress is but a small instalment of a system of public works which challenge general interest by the courage and liberality they display. We mention the principal features.

The European and North American Railway, from Bangor to St. John, New Brunswick, is a line of 194 miles, 84 in New Brunswick and 110 in Maine. The Government o New Brunswick gives $10,000 per mile within its domain as the work proceeds. To the Maine line, the State proposes to contribute from the funds expected from the United States in payment of claims, and has also appropriated a valuable tract of public lands. The city of Bangor has voted to loan its credit for $1,000,000, beside $500,000 to the Piscataquis branch reaching the slate quarries at Brownsville. Work on the main line is in active progress, and a large proportion of the expensive work on the two terminal sections has been accomplished. Track laying was to be commenced about the first of this month, and 55 miles, or half the road in Maine, is to be opened within the present year.

Portland votes $700,000 to the Portland and Ogdensburg, passing through New Hampshire to the Vermont system of roads and completing the line to Lake Ontario. St. Johnsbury, Vt., aids to the amount of $200,000, and Messrs. Fairbanks subscribe $150,000. The Maine Central Extension, from Danville Junction to Portland, is regarded as certain to be built within a few years at farthest.

The line from Bangor to Winterport is under survey.—That from Newport to Dexter is provided with capital and already leased to the Maine Central.—From Belfast to Newport the towns are authorized to subscribe 20 per cent of their valuation to the stock of the Belfast and Moosehead Lake Company, and a number of them have already voted their quotas.—The Somerset road, from Waterville to Solon, is to be built by the towns on its route, several of which have already filled their quotas.—The city of Bath subscribes $123,000 to the stock of the Knox and Lincoln road, and lends $100,000 on condition that the road shall terminate at Bath. In all, according to the railroad contemporary from which we have derived in substance most of the above facts, the length of new road in progress or contemplation amounts to 458 miles, and will nearly double the present system within the state.

Menhaden Oil Manufacture.

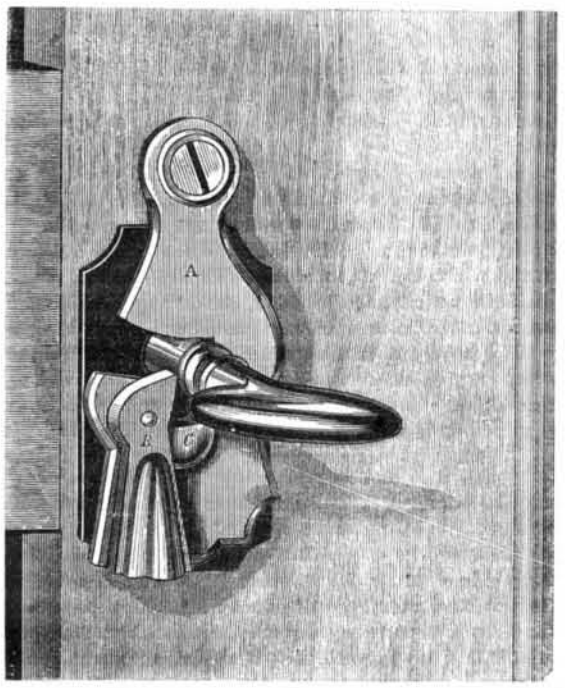
A correspondent in Braintree, Mass., who is well informed on this subject, gives us the following particulars. It will be seen that this branch of business is quite extensive and important: Menhaden oil is extensively manufactured at stations the whole length of the sea coast of New England, beginning at Connecticut and extending as far north as Frenchmans Bay, in Maine.

Beside those in Narragansett Bay there are works at Cape Cod and Cape Ann. In one district Waldoboro, in Maine there are ten establishments with an average capital of five thousand dollars, employing some one hundred men. On Penobscot Bay there are several extensive works owned by Boston capital. There are also some twenty vessels fitted out for the business from the state of Maine, having their furnaces and presses and doing all the work on shipboard.

There is scarcely a town on the sea coast below the mouth of the Kenebec, where menhaden oil in some measure is not manufactured. Near Bristol, R. I., are the extensive works of the Naragansett, Atlantic and Neptune company with a capital of $40,000 and a number of others of lesser note."

MAY'S PATENT KEY GUARD.

A favorite operation of the burglar is facilitated by the carelessness of householders in leaving the key in the lock on the inside, when it may be readily turned by seizing the point with key nippers and turning it in the lock. Yet if the key is taken out there is no obstacle to the use of a skeleton. To overcome these objections and furnish a retreat from this dilemma is the object of the device under consideration. It was patented March 12 1867, through the Scientific American Patent Agency, by Franklin J. May assignor to himself and J. G. Barnum. The key plate, A, may be pivoted either to the lock



or the door. It resembles an ordinary key plate, except that it has a slot cut from one side on a radius struck from the center of its pivot. To one side of the key-plate, beneath the slot, is pivoted a weighted pawl, B, the weight of which keeps it always in an upright position, except when swung to one side by the hand. When in position and the key is in the lock the upper point of the pawl comes against the shank of the key, which at the point where the key-plate slot engages with it, is flattened. It will be seen that as the slot is not wide enough to allow the cylindrical part of the key shank to turn, but fits only the flattened portion, so long as the key plate covers the hole the key cannot be turned. But by inserting a wire or other properly shaped implement from the outside the burglar might swing the key plate to one side. To prevent this is the office of the pawl, B. This, by means of a stop, C, can be swung only in one direction—the weighted bottom away from the key-plate—so that it securely prevents the movement of the plate while the key is in the lock.

It can be attached to locks of all sizes and shapes; it is made of various styles to suit all descriptions of lock, being japanned, bronzed, polished, or plated; the cost is trifling, and its durability equal to the life of the lock. The patent right is for sale. All communications should be addressed to May and Barnum, 74 Bleecker street, New York City.

Hints.

Mr. Rowland Hill, of Richmond, Va., gives this handy rule for ascertaining the area of a circle, when the diameter and circumference both are known and the decimals not remembered: "Multiply the circumference by the diameter and divide the product by 4. The quotient will be the area." We have tested this rule and find it correct. It is worth remembering.

He says again: "When the hinges of a door are not in a vertical line the door exhibits a perversity in remaining either closed or open, which to a good housewife is vexatious. I have often wondered that this obedience to the law of gravitation was not made use of by some of the inventors of self opening carriage gates."

We think it has been applied to this object, but cannot at present refer to the particular case. Common gates and doors which open either way are hung on hinges not in a vertical line.