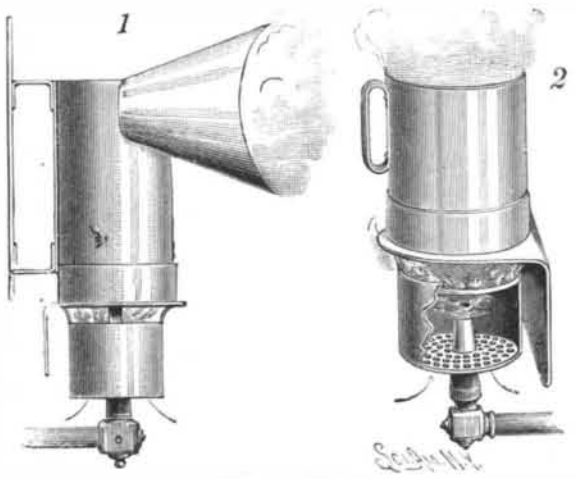
A HEATER FOR USE WITH A GAS BURNER.

The illustration represents a simple device for use in connection with a gas burner, to heat water or other liquids or food, or to heat rooms or passages. It has been patented by Mrs. Mary L. W. Martinot. The burner of the heater is of gauze or equivalent material, with a central opening to receive the gas burner, and upwardly projecting brackets support a semicircular table with a central opening, the table having a flange in contact with which rests a drum of sheet iron or other suitable material. Near the top of the drum is a side opening surrounded by a hood, adapted to direct the ascending hot air some distance out into a compartment to be heated, as shown in Fig. 1. Both the drum and the table have shields at the rear for the protection of adjacent woodwork. When the device is to be used for heating liquids, etc., the drum is removed, and a cup or other receptacle corresponding in contour to the space within the table flange is placed upon the table, as shown in Fig. 2. The device may be further supported, if desired, by attaching the upper shield to an adjacent wall or other upright.

For further information relative to this invention



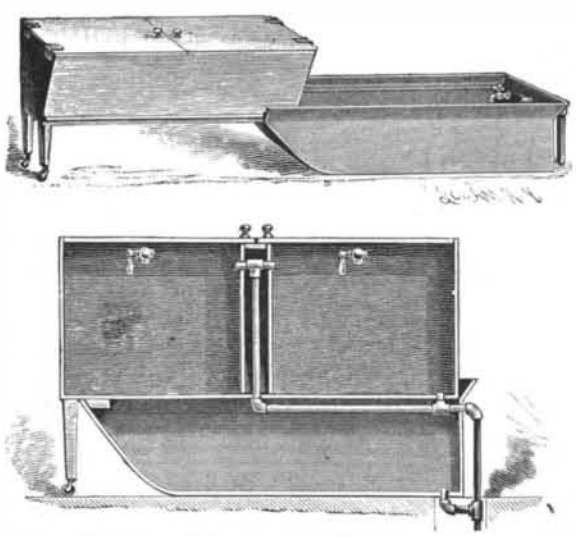
MARTINOT'S HEATER.

address Mrs. Mary White, No. 1541 Broadway, New York City.

A COMBINED BATH AND WASH TUB.

In the construction shown in the illustration either tub may be used independently as desired, and each has an independent overflow or waste, as shown in the lower sectional view. The improvement has been patented by Mrs. Mary L. W. Martinot, of New York City. The bath tub has a top flange extending around both sides and one end, with grooves adapted to serve as slideways for longitudinal ribs on the bottom edges of the wash tub, and the latter has, at one end, legs provided with castors, for its support when drawn out from above the bath tub, as shown in the upper figure. Stop blocks limit the outward movement of the wash tub, and branches of a waste pipe are carried up within the tub in the usual manner. The waste pipe of the wash tub has a sliding connection with the main waste pipe leading to the sewer or other outlet, with which the bath tub also has a bottom connection. When the bath tub is to be used, the upper tub is drawn out, as shown in the illustration, and is afterward returned to place above the bath tub previous to employing the wash tub.

For further information relative to this invention



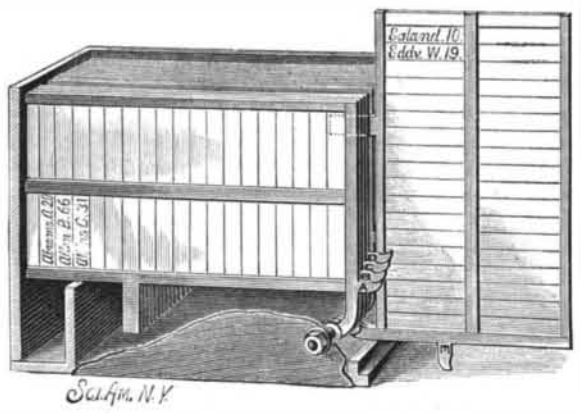
MARTINOT'S COMBINED BATH AND WASH TUB.

address Mrs. Mary White, No. 1541 Broadway, New York City.

THE body of every spider contains four little masses pierced with a multitude of holes, imperceptible to the naked eye, each hole permitting the passage of a single thread; all the threads, to the number of 1,000 to each mass, join together when they come out and make the single thread with which the spider spins its web, so that what we call a spider's thread consists of more than 4,000 threads united.

AN IMPROVED INDEX.

The illustration represents a convenient form of index, by means of which the references contained upon



JUDGE'S INDEX.

any page may be readily exposed to view, the reference cards or memoranda being inserted or changed with facility as desired. It has been patented by Mr. William A. Judge, of Santa Barbara, Cal. The index pages are held in a case open at the top and one end, there being near the inner end of the case a low transverse partition serving as a rest for the sheets in normal position in the case, and near the other open end a similar but lower support to hold up the displayed sheet. A rod held in suitable position by nuts extends through the case near the lower corner of the open end, and upon this rod is pivoted a series of bars each having a slight curve near its pivotal point, and each having a lateral ear adapted to receive an initial letter. These ears are arranged one above another upon the bars, so that all the letters will be exposed to view when the sheets lie horizontally in the case. Extending at right angles from the bars are strips provided with a suitable backing so attached as to form edge grooves, in which may be inserted in the desired order index slips of card or paper, thus making up each index page. Projecting from the lower or inner side of each sheet is a short strip, which extends inward between the adjacent sheets, as shown in dotted lines, when a page is turned out for reference, this strip serving as a guide to hold the sheet in place. Each index page is exposed to view by simply pressing downward upon the ear carrying the proper initial letter, the operation being reversed to return the page to place within the case.

A New Solvent for Cellulose.

BY C. F. CROSS AND E. J. BEVAN.

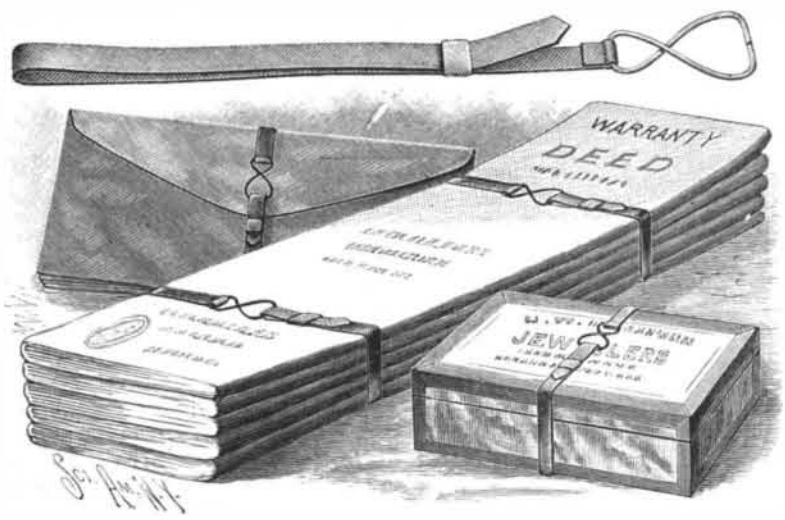
Hitherto we have had no acid solvent for cellulose but such as in dissolving it bring about marked changes in composition and properties. In dissolving, the cellulose is resolved, *e. g.*, by the action of sulphuric and phosphoric acids, into products of lower molecular weight, and cannot be recovered from the solution. Concentrated hydrochloric acid, as is well known, attacks cellulose profoundly. When digested with the acid in the cold the fibers are completely disintegrated, and the resulting modification, obtained as a white powder, manifests very different properties from the original. When warmed with aqueous solutions of the alkalies it is colored deep yellow, and the products of hydrolysis are powerful reducing agents (aldehyds). Some of the OH groups are also so affected that they react with acetic anhydride at its boiling temperature, giving, so far as our determinations show, the diacetate of a C_{18} compound. We find, however, that on dissolving in the acid one half its weight of zinc chloride, a solution is obtained (of specific gravity 1·44) which dissolves cellulose instantly and without sensible modification.

This observation is of importance, as it enables us to investigate some points in the constitution of cellulose for the determination of which such an acid solution is an essential condition. The solution of cellulose obtained by heating it with concentrated solutions of zinc chloride may also be diluted with hydrochloric acid, without precipitating the dissolved products, but the solution by the new reagent has the double advantage of being instantaneous and of being prepared, therefore, with the minimum of resolution of the cellulose into bodies of lower molecular weight which usually attends the somewhat prolonged heating necessary for complete solution in the aqueous solution of zinc chloride.

The reagent we also find of great value in the investigation of structural points, *i. e.*, as an aid to microscopic work in the province of the vegetable fibers. All forms of pure cellulose are rapidly dissolved by the reagent, and the various stages preceding their final disappearance may be observed under the microscope, the observation throwing much light on structural peculiarities. The raw fibers, *e. g.*, cotton and flax, are not dissolved, at least only partially, but swell up under the action of the reagent, with the result that the structural features are brought out with great prominence. Jute and the ligno-celluloses generally are dissolved by the reagent, and many of the adipo-celluloses also. We are investigating these actions more closely, and hope shortly to publish an account of our observations. In the meantime, we commend the reagent in question to all who are engaged in the chemical or microscopic investigation of the vegetable fibers.—*Chemical News.*

AN IMPROVED PACKAGE TIE.

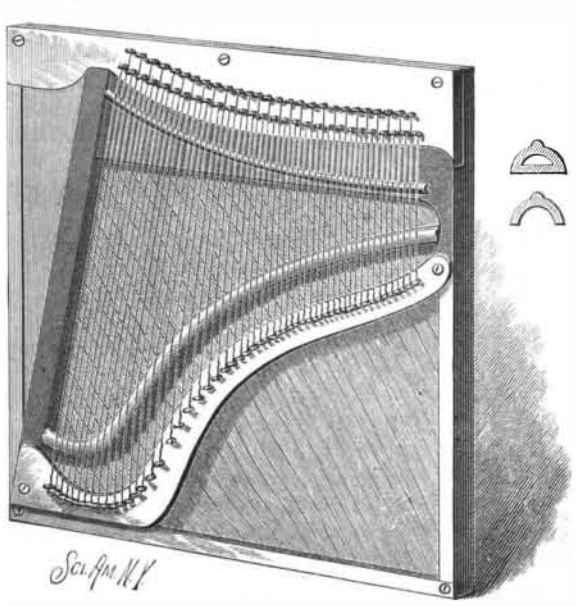
A tie for packages of documents and other articles, which can be readily and easily adjusted to suit the package, and which will not wear or fray out, as is sometimes the case with twine or tape, is represented in the accompanying illustration, and forms the subject of a patent issued to Mr. E. C. Plumer, of Columbia, S. C. The tie, shown separately at the top of the illustration, is made of a thin strip of pliable metal, preferably sheet copper, to one end of which is attached a bent wire link, the attachment being effected by bending the end of the band over one end of the link, where it may be secured by a small rivet if deemed necessary. The other end of the band is made slightly pointed, and is adapted to be passed through the other end of the link, upon which it is closely bent down when the tie is fixed upon a package, the end being secured, after adjustment, by a confining slide on the body of the band. This tie is comparatively indestructible and presents a very neat appearance.



PLUMER'S METALLIC BAND PACKAGE TIE.

IMPROVED SOUNDING BRIDGE FOR PIANOS, ETC.

A sounding bridge designed to greatly increase the volume of sound produced by a piano or other instrument in which the improvement is applied is shown in the accompanying illustration. It forms the subject of a patent issued to Mr. Martin Durick, of No. 567 Spring Street, Buffalo, N. Y. The improved bridge consists of a recessed strip of metal, curved in conformity with the wrest plank of a piano, and in cross section forming a hollow convexed bridge, as shown in one of the small figures at the side, there being a slight rib or projection in the top surface of the bridge upon which the wire rests. A modified form of this sounding bridge is made with a bottom wall, as shown in the other figure, the bridge then forming a hollow strip of metal. The main view shows the wrest plank with the sounding bridge in position.



DURICK'S BRIDGE FOR STRINGED INSTRUMENTS.

Snow Worms.

Referring to a paragraph which appeared in the SCIENTIFIC AMERICAN of February 21, concerning the recent remarkable appearance of worms upon the surface of the snow, in Randolph County, Va., Mr. Geo. C. Hodges writes us that a similar phenomenon has been observed in the vicinity of Utica, N. Y., and in Oneida and Herkimer Counties. Specimens were sent by our correspondent to Prof. C. V. Riley, entomologist, Department of Agriculture, at Washington, who replied to him as follows:

"You send two distinct larvæ. The small species, of which there were 8 or 10 specimens, is the common Pennsylvania soldier-beetle (*Chauliognathus Pennsylvanica*), a carnivorous species which in the larva state destroys plant lice, bark lice, and the eggs and young larva of a number of injurious insects. This insect hibernates in the larva state and has occasionally been observed, both in Europe and in this country, fairly swarming upon the surface of snow, having been driven from its hibernating quarters by some peculiar weather combination. It hibernates at the roots of grasses, under stones and logs and under the loose bark of stumps, logs and old trees. The other and larger larva, of which there was only one specimen in the box, seems to be a variety of the bronzy cut worm (*Nephelodes violans*), an insect which also hibernates in the larva state, and has also been observed occurring in large numbers on snow. It is so recorded by your State entomologist, Dr. J. A. Linter, in his Fourth Report, published in the Forty-first Report of the State Museum, at Albany, N. Y., pages 54 to 57. He records the winter occurrence of this larva on snow at Rockville, Ontario, and Sullivan County, New York."

Amber.

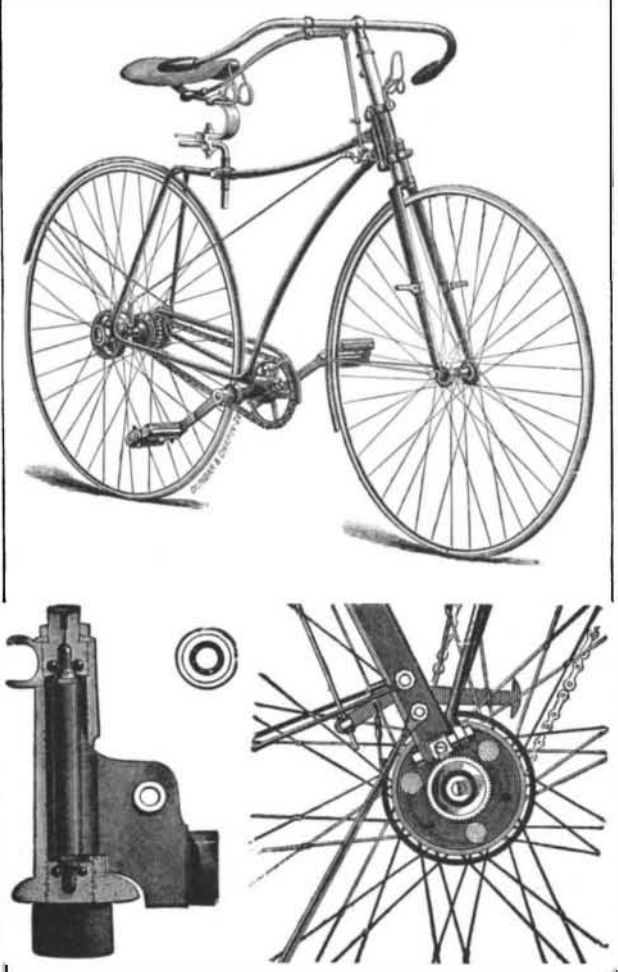
Genuine amber is by no means so plentiful as it was some years ago, and amber cigar holders and pipe stems will probably rise in price. The genuine amber is a fossil gum, which was produced in large quantities by trees having a resinous sap, which flowed down the trunks and collected in masses at the root. It is found in the ground of marshes and other places where forests flourished in former times, and is also obtained by dredging. The German Ocean, Baltic and Black Seas formerly produced it in great quantities, but the supply is constantly decreasing, and, unless other fields are discovered, real amber will soon be scarce and costly. There is some satisfaction in knowing that the imitation is just as good in every way, so that even if the real amber gives out there need be no diminution in the number of holders for cigars or mouthpieces for pipes. In this country comparatively little is used save for this purpose, but in India and China large lumps are in great demand, for, from some cause, an amber idol is far more highly esteemed than a golden image, and so the best amber all goes to the East to be made into gods for the pagans.—*Great Divide.*

A CENTENARIAN.

January 22, Colonel Nathan Whitney, of Franklin Grove, Ill., celebrated his one hundredth birthday. He was born in Conway, Mass., fifteen years after the declaration of independence, and was one of the pioneer settlers of Illinois, having lived within the State for fifty-four years. Before there was a sidewalk laid in Chicago and a bridge over the river, he was appointed a commissioner to organize Lee County and established his home on its prairies. He served in the war of 1812, and was mentioned for bravery at the battle of Lake Erie. Mr. Whitney had reached the age of threescore and ten when the first gun was fired on Fort Sumter. He has seen the development of the greatest nation on the earth from feeble States harassed by foreign foes, menaced by savages upon its borders, to a country of magnificent cities, which no internal war can disrupt and no foreign foe intimidate. He received his first degree of masonry seventy-four years ago, and is probably the oldest mason in the world. We present a portrait of Colonel Whitney, his son, grandson, and great-grandson, four generations. The one hundredth anniversary of Colonel Whitney's birth was made the occasion of a gathering of prominent masons from all over the State. Nathan Whitney Chapter No. 129, Royal Arch Masons, named in honor of Father Whitney, presented him with a solid silver platter, suitably inscribed, and several hundred congratulatory letters and telegrams were received.—*The Graphic.*

A STANDARD BICYCLE.

The New Mail, which is shown in the illustration herewith, has for years, throughout the country, been well known as a first-class wheel, its construction being of a high standard and it having special patented features which are much commended. It has a ball bearing head made after the Trigwell patent, according to which the balls are confined so they cannot fall out and be lost. By its use even and steady steering is obtained with little friction. Another specialty of the wheel is its band brake. It is a band of steel, lined with leather, acting on a drum on the rear wheel axle,



THE "NEW MAIL" BICYCLE.

entirely away from the chain. It is a very simple and positive acting clasp, and the New Mail is the only wheel having it. It is especially of added value this year when cushioned tires are to be used, as these are more delicate than solid tires, and English reports declare the band brake the best for such. The shape of the New Mail handle bars, also, is much approved, being curved and brought low and well back to the rider. The frame is of Credenda tubing; all ball bearings throughout; best hollow, re-enforced rims; tangent spokes, strongly tied and laced and nickeled to intersections. The New Mail is made at Chicopee, Mass., with all parts strictly interchangeable. A new pattern has also been brought out this year to meet the demand for a medium priced safety, having cushioned tires, which give life and elasticity and obviate all jar and vibration. Messrs. Wm. Read & Sons, 107 Washington Street, Boston, are the manufacturers of New Mails and will send full particulars on application.

The New Screw Ferryboat J. G. McCullough.

The new ferryboat for the Erie and Western Railroad, built at Neafie & Levy's, is of the same design as the Hoboken ferryboat Bergen, having a screw propeller at each end, the shaft running the entire length of the boat

The new boat is 215 ft. long over all, 188¼ ft. long between the stern posts, 45 ft. beam moulded, 62 ft. beam over guards, 16 ft. depth of hold amidships, having a gross tonnage of 744 tons. It is constructed throughout of steel.

The machinery consists of compound surface condensing engine, having cylinders 26 and 50 inches diameter by 30 inches stroke, driving a shaft with a propeller on each end 8 ft. 6 in. diameter. The engines are of splendid design, with the ordinary Stephenson link working a piston valve on the high pressure cylinder and a plain slide valve on the low pressure cylinder, and which are reversible by a separate steam engine. The circulating pump is of Neafie & Levy's make, centrifugal in design, and the independent air pump is of the Davidson type. All the bearings are of ample size, and all parts of the engine are perfectly accessible. The boilers are of steel, two in number, each being 12 ft. 8 in. in diameter by 11 ft. long, and supply steam at a pressure of 100 pounds. The engines being all below, but little space is taken off the driveways, enough only to pass the smokestack up, but it is in the side cabins that the enlarged space is appreciated, owing to the entire absence of the paddle wheel houses.

The cabins are wide, well lighted, and finely finished. The sides and ceilings are paneled and finished a pale green, with neat decorations in silver, which makes a most pleasing effect. The windows are very large, the central one in each cabin being of particularly handsome design. The seats are finished in cherry. The electroliers and metal fittings are of splendid design, finished in silver, matching the decorations. The outside is painted a light salmon color.

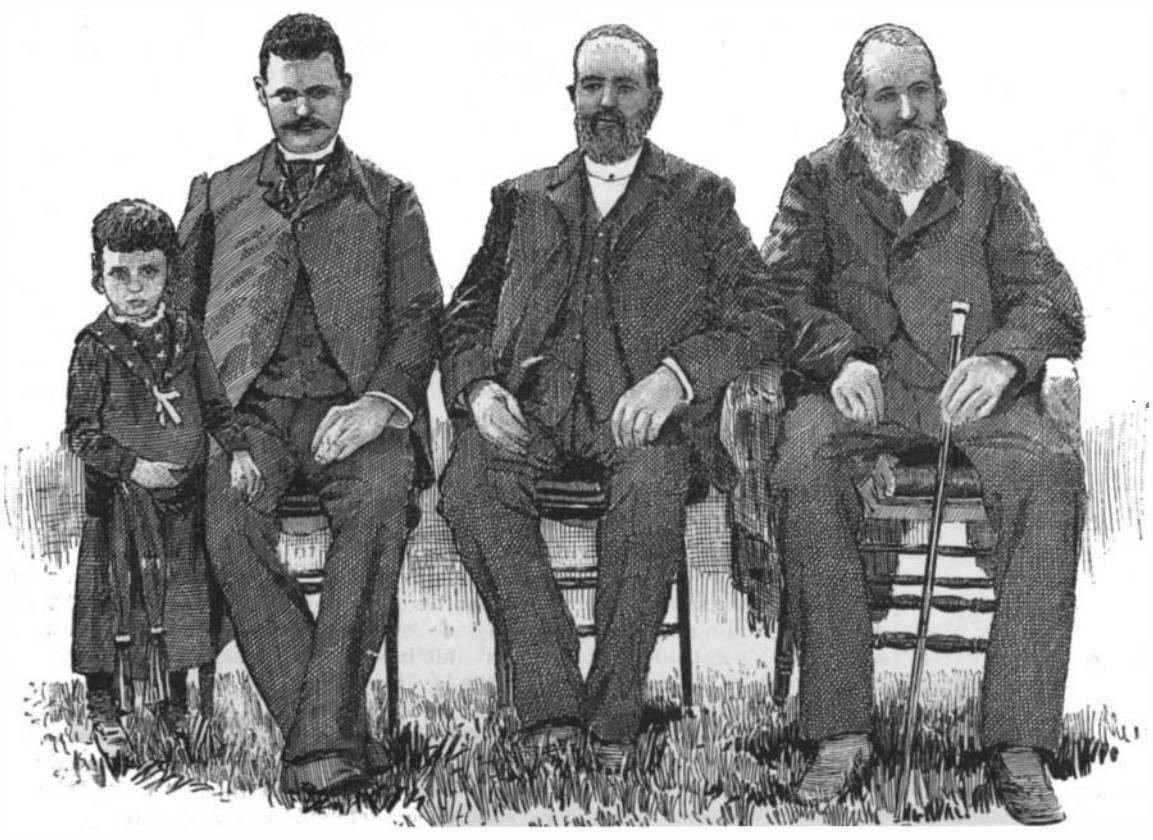
The boat is provided with the Williamson steam steering engines, capable also of being worked by hand. She is lighted all over by the incandescent light, and is in all respects the "most modern" ferryboat in the fullest sense of the word, and she will be the model ferryboat of New York harbor. She has been named John G. McCullough, and will be used for passenger service between New York and the terminal of the Erie Railroad, Jersey City.

Maine Shipbuilding in 1890.

During the year 1890, there were launched from the New England shipyards, according to the Bangor (Me.) *Industrial Journal*, 207 vessels, aggregating 99,842 tons, of which 125 vessels, with a tonnage of 74,465, were built in Maine. Massachusetts came next, with 54 vessels, of 13,603 tons, while Connecticut had 82 vessels, of 11,772 tons.

Of the Maine fleet, the most notable is the ship Shenandoah, which registers 3,406·78 tons gross, and 3,258·58 net, and is the largest wooden ship afloat. Also of great proportions, surpassed only by the Shenandoah, is the Rappahannock, registering 3,053 tons net. The Parthea, 2,371 tons, the St. Marys, 1,943 tons, the L. D. Carleton, 1,788 tons, were among the finest ships that ever left Maine stocks.

Schooners continue to largely predominate among the vessels built in Maine yards, and big fore-and-afters seem to be as popular as ever. The number of four-masted schooners launched is in the vicinity of 30, about one-half of which slid into the waters from Bath ways. No less than 13 of these big fore-and-afters registered upward of 1,000 tons, yet they are not as large as the five-masted schooner Governor Ames, 1,690 tons, launched in Waldoboro in 1888.



COLONEL WHITNEY, HIS SON, GRANDSON AND GREAT-GRANDSON.

THE brownish discoloration of ceilings where gas is used is caused by dust, carried against them by the heated air currents produced by the gas.