

are 16 arch top windows, on each side, 8 below and 8 above. Those in the first story are 2 feet 6 inches wide, and 4 feet 9 inches high, and in the second story, 2 feet 6 inches wide, and 4 feet high. They have each two sashes, which are arranged to be raised and lowered. Those in the first story are divided into four lights each, and those above into two lights each. The upper windows are provided with shutters or blinds. The immense body or house, whichever you please to call it, will be hung upon platform springs, which will be of in all sufficient strength to support 25 tons weight. The wheels will be 3 feet 2 inches and 4 feet 4 inches in diameter respectively. Hub: 18 inches in diameter; felloes: 9 inches on the tread, and 6 inches deep. The Brobdignagian wagon is intended for hotel purposes during the Centennial Exhibition. The first story will be used as a dining saloon, and the second story will contain 16 staterooms, with 2 berths in each. It is proposed to place this portable hotel somewhere on the exhibition grounds, there to remain stationary until the close of the exhibition. The gearing or carriage part will have no other labor to perform than to support the body in going to and from the exhibition grounds.

ASTRONOMICAL NOTES.

At a recent meeting of the Royal Astronomical Society, Mr. Burton, who was for two years an assistant to the Earl of Rosse, stated that, during that period, there had only been three hours of what might be called excellent definition for the great six-foot reflecting telescope. In general, they had to use the three-foot reflector for their observations.

With this instrument, on one occasion, during exceptionally fine weather, he had been able distinctly to detect that the fine markings on the planet Mars were composed of a texture resembling the stippling of a mezzotint engraving. On no other evening had the definition been sufficiently good to recognize the same details.

We hope that our Washington astronomers will turn the great refractor towards the planet when occasion offers, and let us know how the markings which Mr. Burton speaks of appear in that instrument.

Spots on the Sun.

The students of Vassar College report as follows: Our record is from February 17 to March 14 inclusive. The period has been marked by an unusual degree of change in the spots. Between the noon of February 17 and that of February 18, two small ones near the center disappeared and a new one appeared. On February 20 a pair of spots were seen, a little to the east of the center, which seemed to have been formed by the division of one spot noticed on February 18. A new small one had also appeared, a little past the center. The next observation was made on February 26, when a good sized group was seen east of the center, and on February 28 the largest member of this group showed an umbra of peculiar shape, resembling a palm leaf. On March 2 the stem of the leaf had apparently separated and formed a new spot close to the first. Considerable changes had taken place since February 28. One circular spot, which on that day was on the eastern limb, had disappeared. March 3 showed a new spot to the west of the center, and between March 3 and 4 there was a still more decided change. Two groups, which on the 3rd were small, had resolved themselves into several spots, and a new group had appeared below the center. On the 4th two photographs were taken eleven minutes apart, and there were indications of change in the spots even in that short time. Owing to cloudy weather no observations were made after March 5 until March 14, when the spots were unusually large.

Faculae were noticed February 17, 18, and 20, and March 5.

Joseph Harrison.

We hear, with regret, of the death of Joseph Harrison, of Philadelphia, Pa., well known in engineering circles as one of the greatest American mechanics. Born in 1810, he showed proficiency at a very early age, and served as apprentice, journeyman, and foreman till he was 25 years old, and was then in the employ of Garrett & Eastwick, in Philadelphia, where he designed and built a locomotive. This was in the year 1835, and the business increased so fast (after the then unworsted achievement) that he was taken into partnership. Some agents of the Russian government soon afterwards suggested to Eastwick and Harrison that one of them should go to Russia, where the government was about to invite proposals for the whole of the rolling stock for the great railway, 400 miles in length, from St. Petersburg to Moscow. Mr. Harrison went to St. Petersburg, arriving there in 1843, with the remainder of \$500 in his pocket, Mr. Thomas Winans, of Baltimore, who had gone there to superintend the working of a locomotive, uniting with Mr. Harrison in making proposals. The contracts were ultimately awarded to them, under the firm of Harrison, Eastwick & Winans. They constructed 162 twenty-five ton locomotives; 2,000 eight-wheel cars; 500 eight-wheel platform cars; 70 eight-wheel passenger cars on the American plan; 6 eight-wheel post cars; the total of the contract amounting to \$3,000,000. All this work was constructed in government shops, at St. Petersburg, by Russian workmen, and was completed in five years. Mr. Harrison's high personal character obtained for him the means of carrying out this large contract on his very small capital; and after this great success and many others, he returned to Philadelphia in 1852, since when his greatest work has been the production of the Harrison boiler, one of the most highly esteemed of several inventions which defeat the danger by explosion of boilers by building them in sections.

He also introduced into Europe the American drop bottom cupola, for iron smelting, the smelters having previously, at the end of the heat, pulled the slag, etc., from a small door

or the tap hole, instead of dropping the bottom as is now done. He patented the equalizing beam for distributing equally the weight of the locomotive on the drivers, and the Harrison stub end (without keys) for the connecting rods. He designed and first used the tool for boring both the crank pin holes at right angles at the same time, thus doing the work mechanically correct as well as much cheaper.

The integrity and moral courage of this eminent man laid the foundation of his success and his great fortune; and those who knew him, whether as a husband, father, son, friend, or citizen, will sincerely mourn his death.

Shell Heaps in Maine.

At a meeting of the New England Historic-Genealogical Society, held a few days ago in Boston, Professor Rufus K. Sewall, of Wiscasset, Me., read an interesting paper on the ethnological remains and shell heaps at Damariscotta. He prefaced his essay, says the Boston *Globe*, with a very graphic description of the inlets and bays along the coast in that vicinity, as well as a review of the discovery of that region, with extracts from letters written at various dates by the early explorers. He exhibited several specimens of oyster shells, as well as pieces of pottery, found in large quantities at the head of the Damariscotta River. The shells, he said, must have been piled there by a people who lived previous to any period of history referred to by documentary or traditional testimony. Skeletons were found at various points along the seaboard; but while several fragments of utensils for the performance of household work were found, no darts or spears seem to have been discovered. From the data at his disposal, the lecturer deduced the following conclusions: First, that there were oysters along the coast of Maine in the early ages of this country, and the shell heaps were piled up by human hands; secondly, the site of these huge deposits was the home of a primitive population; thirdly, these inhabitants were a domestic people, they cooked their food in a manner which bespoke civilization; fourthly, they had clear perceptions of the utility of mechanical appliances; fifthly, there were successive races in these localities, the latter of which were more nomadic than their predecessors, and lastly, these settlers came from eastern countries. He cited several additional facts in support of these theories, and closed with a summary of the proofs adduced, from which he claimed that it was clear that the aboriginal inhabitants of Maine came from the East, and brought with them the civilization which then prevailed. Mr. Kidder, a member of the society, made a few remarks in which he controverted several of the theories advanced by Mr. Sewall. He said that shell heaps, similar to those at Damariscotta, were found all along the coast from Canada to Florida. Professor Morse, of the Essex Institute, also bore testimony to the existence of such deposits at various points in this country, the exact counterparts of some discovered in Denmark.

DECISIONS OF THE COURTS.

Supreme Court of the United States.

GLYCERIN PATENT.—ROLAND G. MITCHELL vs. RICHARD A. TILGHMAN. [Appeal from the Circuit Court of the United States for the Southern District of New York.—October Term, 1873.]

On the 3d of October, 1854, letters patent were granted to the complainant for a new and useful improvement in processes for purifying fatty and oily substances of animal and vegetable origin, and which contain glycerine (glyceryl) as their base. His invention, as the patent states, consists of a new and improved mode of treating such substances in order to produce fat acids and solution of glycerin, which, as he says, was not known or used before his application, and the recital of the patent is that it shall take effect from the 9th day of January preceding the date of the instrument.

By virtue of the said letters patent, as the complainant alleges in his bill of complaint, he acquired the exclusive right to make and use the described improvement, and to vend the same to others to be used; and he also alleges that the respondent, prior to the time when the bill of complaint was filed, without his licence and in violation of his rights, engaged in making and using his patented process, and that he, the respondent, intends to continue to make and use the same, as set forth in the bill of complaint.

Service was made and the respondent appeared and filed an answer setting up several defences, as follows: 1. That the complainant, on the 9th of January, 1854, was not the original and first inventor of the improvement described in the said letters patent. 2. That the result described in the specification and claims of the patent cannot be accomplished, so as to be practically useful, by the method and apparatus described in the specification. 3. That the respondent never practiced or used the patented process of the complainant as charged in the bill of complaint, or in any other manner. He admits that he is engaged in manufacturing candles, and that in manufacturing such articles he uses water and steam at high temperature, and that he also uses such pressure as arises from the expansive force of hot water or steam in a close vessel; but he denies that he uses any such method, process, or apparatus as those described in the letters patent of the complainant.

4. That the patented processes described in the specification were well known to chemists and men of science and to manufacturers long before the alleged invention of the complainant, and were also used and practiced by them, and were described in printed publications before the complainant filed his application for a patent. 5. That the use of a close vessel of sufficient strength to resist the pressure of water when heated, or any pressure needed when using water to decompose other substances, was known to, and practiced by, men of science and manufacturers in this country and elsewhere long before the alleged invention; that highly heated water, when used as described, is an elementary principle open and free to all, and that such a principle is not one that is subject to a patent; that a prior knowledge of the alleged invention was possessed by many other persons, and that the same was described in many printed publications, as fully set forth in the answer.

On the 23d of November, 1867, the patent of the complainant was extended for seven years from the expiration of the fourteen years for which the original patent was granted. Subsequently, to wit, on the 6th of March, 1871, the complainant instituted a second suit against the respondent, founded upon the extended patent, which is No. 340 on the calendar. Both cases were heard at the same time. Suffice it to say, in respect to the latter, that the pleadings, issues, and proofs in the two cases are substantially the same, and that the latter must be disposed of in the same way as the preceding case.

Decrees were entered in these cases, respectively, in the circuit court in favor of the complainant, each of which must be reversed. The decree in each case is reversed, with costs, and the cases are, respectively, remanded, with direction to dismiss the respective bills of complaint. The Court held substantially as follows: The claim in every patent must be construed to be limited to the method or process described in the specification. A claim in these words, "The manufacturing of fat acids and glycerin from fatty bodies by the action of water at a high temperature and pressure," interpreted on reference to the specification to mean a process for decomposing fats, and converting them into oleate, margarate, and stearate, and a solution of glycerin, by, among other measures, mixing the fat and water together, and forcing the water up through the mixture, and spraying it over the top whence it settles through, and by subjecting the mixture for several hours in a close vessel to such a heat that the pressure equals that of from ten to twenty atmospheres.

Thus interpreted, the claim is not infringed by a process consisting of mixing melted fat and water, forcing the water up through the mixture, and spraying it over the top whence it settles through, and by subjecting the mixture for several hours in a close vessel to such a heat that the pressure equals that of from ten to twenty atmospheres.

Dictum. A newly discovered principle or property of matter may be patented provided a new and useful result has been obtained from the application of it, and the specification describes how the result is to be obtained.

Dictum. A patent is invalid if the result which is predicted cannot be obtained by the means described.

Dictum. Or, if the process cannot be performed without da to the operator.

HOW SHALL I INTRODUCE MY INVENTION?

This inquiry comes to us from all over the land. Our answer is: Adopt such means as every good business man uses in selling his merchandise or in establishing any business. Make your invention known, and if it possesses any merit, somebody will want it. Advertise what you have for sale in such papers as circulate among the largest class of persons likely to be interested in the article. Send illustrated circulars describing the merits of the machine or implement to manufacturers and dealers in the special article, all over the country. The names and addresses of persons in different trades may be obtained from State directories or commercial registers. If the invention is meritorious, and if with its utility it possesses novelty and is attractive to the eye, so much the more likely it is to find a purchaser. Inventors, patentees, and constructors of new and useful machines, implements, and contrivances of novelty can have their inventions illustrated and described in the columns of the *SCIENTIFIC AMERICAN*. Civil and mechanical engineering enterprises, such as bridges, docks, foundries, rolling mills, architecture, and new industrial enterprises of all kinds possessing interest can find a place in these columns. The publishers are prepared to execute illustrations, in the best style of the engraving art, for this paper only. They may be copied from good photographs or well executed drawings, and artists will be sent to any part of the country to make the necessary sketches. The furnishing of photographs, drawings, or models is the least expensive, and we recommend that course as preferable. The examination of either enables us to determine if it is a subject we would like to publish, and to state the cost of engraving in advance of its execution, so that parties may decline the conditions without incurring much expense. The advantage to manufacturers, patentees, and contractors of having their machines, inventions, or engineering works illustrated in a paper of such large circulation as the *SCIENTIFIC AMERICAN* is obvious. Every issue now exceeds 42,000 and will soon reach 50,000, and the extent of its circulation is limited by no boundary. There is not a country or a large city on the face of the globe where the paper does not circulate. We have the best authority for stating that some of the largest orders for machinery and patented articles from abroad have come to our manufacturers through the medium of the *SCIENTIFIC AMERICAN*, the parties ordering having seen the article illustrated or advertised in these columns. Address

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NEW BOOKS AND PUBLICATIONS.

THE PRINCIPLES OF CHEMISTRY AND MOLECULAR MECHANICS. By Dr. Gustavus Hinrichs, Professor of Physical Science in the State University of Iowa, etc. New York: B. Westermann & Co.

It has been stated by a modern savant that the science of mechanics is universal, ultimate, and all-including, and that chemical action is as certainly a matter of mechanical arrangement as are light, heat, and electricity. To this view modern research is constantly tending, and the current literature of the schools is beginning to recognize recent progress in this direction. The book now before us is a compendium of what has already been discovered and laid down in the form of general laws according with the above mentioned theory, and is a most valuable contribution to our higher scientific literature, which we cordially commend to our readers as worthy of attentive study, and as a most excellent text book.

INSTRUCTIONS IN MODERN AMERICAN BRIDGE BUILDING, with Practical Applications and Examples, Estimates, and Tables. By G. B. N. Tower, formerly Chief Engineer in the United States Navy, and Chandler Instructor in Civil Engineering at Dartmouth College. Illustrated. Price \$2. Boston: A. Williams & Co., 135 Washington street.

A handy little book, full of information clearly and concisely expressed.

THE UNITED STATES LAW DIRECTORY FOR 1874, containing the Names of One or More Reliable Law Firms, Banks, and Real Estate Agents in each of the Principal Cities and Towns of the United States and Canada.

We have here a portly volume, compiled with great care and considerable labor. Each State has a section of the work devoted to it, which is preceded by a digest of the laws and court calendar. The work is revised and reissued annually, and deserves the attention of the legal profession on account of the information it contains concerning all parts of the United States.

THE SECTORIAN SYSTEM OF RAILING, Elucidating the Whole Subject by Fifteen Plates. By William Forbes, Architect. Price \$5. New York: A. J. Bicknell & Co., 27 Warren street.

This work exemplifies a new method of laying out stair and other railings, by the use of a sector, which the author describes as "a mathematical instrument founded on Euclid I, 5, and adapted to this system." The tool can be readily made by any workman; and the system, admirably illustrated and described in the book before us, will, no doubt, soon be put to a practical test.

Inventions Patented in England by Americans.

[Compiled from the Commissioners of Patents' Journal.]

From March 10 to March 12, 1874, inclusive.

BRECH LOADING FIRE ARMS.—B. Burton, Brooklyn, N. Y.
 DRYING BONE BLACK.—P. Farley, New York city.
 GAS MANUFACTURE.—D. Davison, New York city.
 GRIPPING TOOL, ETC.—D. L. Kennedy, New York city.
 HOISTING DOOR, ETC.—J. W. Meaker, Detroit, Mich.
 HOSE COUPLING, ETC.—D. Ashworth, Wappinger's Falls, N. Y.
 ICE MANUFACTURE, ETC.—S. B. Martin, San Francisco, Cal.
 METAL BOOT SOLE.—J. A. Punderford, New York city.
 ORDNANCE.—N. Wiard, Washington, D. C.
 ORGAN STOP.—T. Winans, Baltimore, Md.
 PROPELLING BOATS AND CARS.—T. J. O'Toole, Brooklyn, N. Y.
 PUMP.—W. J. Silver et al., Salt Lake City, Utah.
 STEAM GENERATOR.—W. E. Kelly, New Brunswick, N. J.

Recent American and Foreign Patents.

Improved Millstone Driver.

Moor Holden, Cincinnati, O.—This invention relates to an improved form of sockets and bushings in one piece or casting which are embedded permanently in the eye of the runner, and which operate to balance and drive the same, while serving as an inlet for the grain. The improvements are designed to combine in the most perfect manner the advantages of easy and certain feed with a firm yet delicate poise of the runner, whereby the latter is enabled to readily accommodate itself to the face of the bedstone without binding or raking, and, consequently, without loss of power or the liability to overgrind, scorch, or "kill" the flour.

Improved Fertilizer.

George J. Poppin, Baltimore, Md.—This invention consists in a fertilizer made of phosphate of lime and powdered trippol in mechanical mixture.