thereto for a certain definite time, the amount of heat and the time varying according to the mineral compound with which the rubber is incorporated. The heaters are, therefore, arranged with thermometers for gauging the temperature, and are made somewhat like steam boilers, some of them being 100 feet long; into these heaters run tracks on which long platforms, laden with articles to be vulcanized, are rolled in, and the steam is let on to raise and keep the required temperature. The great length of these heaters arises from the necessity of making long stretches of belting, and also from the amount of hose made in lengths of fifty feet.

In this connection considerable interest attaches to an immense steam press, the largest of its kind in the world which the company have recently completed, and which is shown to the right at the bottom of the page. This press will take a belt 6 feet wide, and 15 feet of its length, at once; it weighs 85,000 pounds; the steam is let into the bed and platen so that the temperature can be readily regulated; the platen is stationary, and the bed is lifted by hydraulic pressure. The most novel feature of this great press, however, is that it is arranged with appliances at each end for stretching the belts, so that, while the belt is under the full tension of the heaviest strain it may be desired to put upon it, it may at the same time be compressed between the hot plates, and thus set its fibers as firmly as a bar of steel. It does not seem very likely that an engineer would ever be troubled with having to "take up" a belt whose "stretch" had been taken out in this way.

The N. Y. B. & P. Company own the patent for this stretcher in combination with the press, as they do many other patents of great importance in the business. The principal Goodyear patent on vulcanizing expired in 1865, but this company had then been many years manufacturing, and had obtained subsequent patents for improvements, some of which are of great value in their present manufactory.

The offices, salesroom, and warehouse of the Company are at 37 and 38 Park Row, New York. John H. Cheever is the treasurer of the company and general manager of the business.

RECENT DECISIONS RELATING TO PATENTS.

U. S. Circuit Court—Southern District of New York.

STRAUSS *et al. vs.* KING *et al.*—PATENT PANTALOONS.

The application of rivets to pockets for uniting and closing the end of the seam at the corners, as claimed in reissued patent No. 6,335, dated March 16, 1875, involves invention, is not a mere double use or aggregation, and is patentable.

Blatchford, J.:

This suit is brought on reissued letters patent granted March 16, 1875, to Jacob W. Davis and Levi Strauss & Co., for an "improvement in pantaloons," etc., the original patent having been granted to them May 20, 1873, on the invention of said Davis.

The claim of the reissued patent is as follows:

As a new article of manufacture, pantaloons or other garments having their pocket openings secured at the edges by means of rivets or their equivalents, substantially in the manner described and shown.

This case has been contested with great vigor. The bill was filed in November, 1876. Testimony was taken from May, 1877, to July, 1878. The plaintiffs examined two hundred and eighty-three witnesses, and the defendants one hundred and forty-five. The plaintiffs' proofs cover two thousand four hundred and sixty-five printed pages, and the defendants' one thousand one hundred and ninety-six. The plaintiffs' brief covers three hundred and twenty-three printed pages, and the defendants' one hundred and fifty-two. Infringement is not contested, but the defendants rely on want of patentability and want of novelty in the thing patented.

On the point that there is no invention in the thing patented the defendants contend that the want of patentability consists in the fact that the invention is nothing more than the employment at the corners of a pocket opening of the old and well known rivet, and that no new function is performed by the rivet in that place from what is performed by it in any other place. The invention is claimed as an improvement in the pocket opening of a garment which has a pocket opening. It does not extend to anything but a pocket opening. It requires that the seam which unites two pieces of cloth laterally shall terminate at the commencement of the pocket opening; that such seam shall be made by means of sewing the two pieces of cloth together laterally by thread; that the rivet shall be of metal; that it shall be placed in the seam at the edge of the pocket opening—that is, where the seam ends and the pocket opening begins, but still in the seam; that it shall be so located and fastened with reference to the two lateral pieces of cloth which the seam unites as to bind together such two lateral pieces of cloth by pressing tightly upon both of them; that this shall be effected by putting the rivet through a hole and heading it down on both of the two opposite faces where the hole begins and ends; that the operation of the rivet when so set shall be to receive the strain which results from pressure from within on the edge or end of the pocket opening and keep such strain from coming on the thread of the seam, and thus protect such thread from ripping or starting and allowing the seam to open, and that the practical advantage of the arrangement shall be to get rid of the frequent renewal by sewing of the thread in the seam at the edge of the opening. In view of the testimony as to the state of the art prior to the invention of Davis, all the foregoing features are involved in such invention. They all appear on the face of the specification of the patent and are embraced in the claim. They amount to invention and they embody patentability. The result of them was new and useful. The case is not one of mere double use or of the use of an old rivet in a new place. It is not merely the usual through-and-through binding or uniting function of the rivet that is availed of.

It is argued for the defendants that there is no combination between the rivet and the sewed seam, but a mere aggregation; that the claim is not confined to the application of a rivet to a sewed seam; that a stay of sewed thread is the equivalent of a rivet; that in view of the prior use of a stay of sewed thread at the corner of a pocket opening there was no invention in the change to a metal rivet, and that a button had before been sewed on with thread at the upper end of the seam, at the edge of the pocket opening, to prevent the thread of the seam from being worn away, and the seam had been stayed by sewing in leather or other fabric, and there was no invention in passing from these arrangements to Davis's. It is sufficient to say that there is no force in any of these suggestions as against the validity of the patent, nor is it shown that the invention as before defined was known or in use before it was made by Davis. The defendants, to defeat the patent on the ground of want of novelty, must make out the defense by satisfactory and preponderating proof. This they have not done. In coming to this conclusion I have considered the Magee coat, the Nightingale coat, the evidence grouped in the defendants' brief under the heads "Nevada (C)" and "Nevada (D)," the evidence of Stanton, Ford, Wilson, Richville, and Hogbin, the Orr overalls, the patent to Bowker, and the patent to Bellford.

There must be the usual decree for the plaintiffs.

The Voyage of the Anthracite.

The experimental steamer Anthracite, described in our last issue, arrived at St. John's, Newfoundland, June 21, eighteen days from Liverpool. The weather was boisterous throughout the trip, making the speed of the little vessel somewhat less than was anticipated. Only 20 tons of coal were consumed on the voyage, and 436 gallons of water—a practical demonstration, it is thought, of the economy of the Perkins' system of high pressure engines which was on trial. The Anthracite is the smallest steamer that ever crossed the Atlantic. Her total length is 84 feet; beam, 16 feet; and depth, 10 feet, her engine and boiler room being 22 feet 6 inches. Her gross tonnage is 70·26 tons, and her registered tonnage 27·91 tons.

Correspondence.

The Temperature of the Sun.

To the Editor of the Scientific American:

On page 405 of your issue of June 26, 1880, in the article entitled "What is the Temperature of the Sun?" I discover a singular error. Mr. Sawyer estimates the diameter of the earth's orbit to be 190,000,000 miles, and the diameter of the sun at 800,000 miles, the diameter of the orbit being 237·5 times the sun's diameter. He thereupon computes the surface of the imaginary hollow sphere of 190,000,000 of miles diameter at 237·5 times that of the sun, instead of using the *cube* of 237·5 as the multiplier. Correcting this error, Mr. Sawyer's figures would make the temperature of the sun 1,339,648,437°, which will hardly corroborate his first estimate, in which all the sums on which he bases his calculations are assumed. O. E. TOWN.

Washington, D. C., June 21, 1880.

What is the Temperature of the Sun?

To the Editor of the Scientific American:

In your paper of June 26, 1880, there is an attempt to answer this question.

By a comparison with that of the voltaic arc, W. E. Sawyer finds the temperature of the sun to be "not less than 12,000°, nor more than 50,000° Fah.," and then in "another way," evidently peculiar to himself, he obtains a similar result. That *other way*, Mr. Editor, is unique! Look at it a little. Assuming the mean distance of the sun to be 95,000,000 miles, Mr. Sawyer proceeds to obtain the diameter of the earth's orbit by doubling its mean radius and adding 800,000. Why add the diameter of the sun? He evidently is not aware that the linear distances of heavenly bodies are calculated from center to center.

Again, imagining the diameter of the earth's orbit to be that of a hollow sphere concentric with the sun, he states that the surface of that sphere would be "237·5 times the surface of the sun," because, forsooth, "the diameter of the sun is contained in the diameter of the earth's orbit 237·5 times." Mathematics teaches that *similar surfaces vary as the squares of their homologous lines;* that is, the surface of the hollow sphere will be to that of the sun as the square of 237·5 is to the square of 1, as 56,406·25:1. Now the heat from 1 square foot of the sun's surface will be spread over 56,406·25 square feet of our assumed sphere, and its intensity on 1 square foot must be less than $\frac{1}{56406}$ of what it is at the sun. If, then, we take the assumed mean of 100° at the earth, the temperature of the sun must be 5,640,625°, which corresponds more with the figures of "those who have estimated into the millions" than with what W. E. Sawyer has observed in electric temperatures. T. ROBINSON.

Washington, D. C., June 21, 1880.

The Melbourne Exhibition.

All the space assigned to the United States at the approaching International Exhibition at Melbourne, Australia, has been taken, and a very creditable exhibition is promised. Our exhibits will occupy 48,500 square feet in the Main Hall, 14,500 square feet in Machinery Hall, and a small space near the main entrance. Commissioner Pickering sails from San Francisco about the middle of July. He reports that the exhibition of agricultural implements will be the best ever made. The United States is expected to make an especially good display in the following sections:

Silver-plated ware, watches and clocks, cotton goods, fire-arms, tobacco, glassware, musical instruments, particularly in organs, axes and edge tools, locks and household hardware, carriage material, printing presses and type foundry material, sewing machines, scales and weighing machines, carpenters' tools, dental manufactures, chilled iron car wheels, lamps, stamped tinware, and seamless metal goods, billiard tables, safes, steam pumps, saws, and portable farm engines.

The exhibits of Connecticut will be shown collectively. There will be between 400 and 500 American exhibitors, including a large number of our most prominent firms.

Gen. John A. Sutter.

The marvelous rate at which history is made nowadays is forcibly brought to mind by the death of General Sutter, in whose mill-race gold was first found in California, only thirty-two years ago. General Sutter (originally *Suter*) was born at Kandern, Baden, February 15, 1803. He was educated in Switzerland, and emigrated to this country in 1834. After many adventures in the Far West and along the Pacific coast, engaged in the fur trade, he settled on a grant of land which included the present site of Sacramento, Cal., calling his fort New Helvetia.

The Mexican authorities appointed him governor of the northern frontier country; and, subsequently, under the American authorities, he was justice of the peace and Indian agent. He acquired great influence and wealth, but was ruined in 1848, when gold was discovered on his property, near Coloma, El Dorado Co., in February. His laborers deserted him, and his lands were overrun by the gold diggers. During recent years he has received an annual allowance of $3,000 from the State of California. In 1873 he removed to Litz, Lancaster county, Penn. He died at Washington, June 18.

The Pittsburg Exposition and Fair.

The Fourth Exhibition of the Pittsburg Exposition Society will be held next fall in the city of Allegheny, Pa., beginning September 2 and continuing until October 9. The success of the previous exhibitions has led the board of managers to add a fair to the Exhibition of this year, and to offer liberal premiums for live stock, farm and garden products. In furtherance of the latter project the area of the Exhibition grounds has been increased to twenty-five acres, and ample space has been allotted for the stabling and care of stock. The old buildings have been renovated, and a new and capacious machinery hall has been constructed, besides a boiler house and a large annex to the floral hall. New and powerful engines have been supplied, and every effort will be made to make the Exhibition profitable to exhibitors and enjoyable to the public. The allotment of space will begin July 26. Space is free; the entrance fee—Exhibition department, $5; Fair department, $2.

The Cincinnati Industrial Exposition.

The Eighth Industrial Exposition under the auspices of the Cincinnati Chamber of Commerce, Board of Trade, and Ohio Mechanics Institute will begin September 8 and close October 9. It will be open for the reception of Exhibits from August 18. From most exhibitors an entrance fee of two dollars is charged, but there is no charge for space or for motive power. Liberal preparations have been made for the exhibition of machinery in operation, and for the display of natural and industrial products, manufactures, and works of art. The exhibition last year represented twenty-four States, and was attended by 422,957 visitors. The coming exhibition promises to surpass in interest and value those which have preceded it. Over a thousand cash premiums and medals of gold, silver, and bronze are offered for competition.

The Cost of Keeping Soldiers.

The Paris *Constitutionnel* has been calculating the average cost of soldiers in the various European countries. It appears that the annual cost of each soldier in the English army is $700. The soldiers of Austria-Hungary cost $255 each a year. Those of France and Germany $215 each. The Italian soldier costs a trifle less than $200, and the Russian little over $190. The maintenance of the army costs annually to each head of the population, 6s. 6d. in Italy; 7s. 4d. in Russia; 8s. 6d. in Germany; 12s. 4d. in France, and 12s. 6d. in Great Britain.

Winking Photographs.

Winking photographs are said to be produced in the following manner: One negative is taken with the sitter's eyes open; another without change of position, with the eyes shut. The two negatives are printed on opposite sides of the paper, "registering" exactly. Held before a flickering lamp, or other variable source of light, the combined photographs show rapid alternations of closed and open eyes, the effect being that of rapid winking.