The Self-leveling Ship's Berth.

A special exhibition of the Huston self-leveling berth was given on board the Havana steamer City of Alexandria, April 28. This berth is so hung and balanced as to maintain a level surface whatever may be the rolling or pitching of the vessel. By this means two sources of discomfort during sea-voyages are materially overcome. The new berths are placed like ordinary berths, and take up but little more room; and while they must necessarily partake of the larger motions of the ship they are quite free from sudden pitching and rolling. Many who have used them at sea testify to a complete exemption from sea-sickness while occupying them. And to those who do not suffer from this distressing malady their advantages would seem to be scarcely less marked. They are so well balanced, and keep their level so surely, that their occupants can lie at ease, with no risk of being thrown out by a sudden lurch of the ship. Any one who has been tossed about in an ordinary berth will appreciate the luxury of a level and steady sleeping place during rough weather.

Was it Wind or Lightning?

A suit has been brought in the Circuit Court at Madison, Wisconsin, to collect from an insurance company for damages done by the great storm of 1878. The property was insured against lightning, and the company resist payment on the ground that it was destroyed by wind. The plaintiff hopes to prove by the evidence of members of the Signal Corps that the whirlwind which destroyed his house was of electrical origin. A vast amount of insurance is likely to be affected by the decision of this case, owing to the heavy losses of property during the recent whirlwinds.

River Scenery of Alaska.

Alaska is covered with a network of deep, cool, perennial streams, that flow on, ever fresh and sweet, through grassy plains and mossy bogs and rock bound glacial cañons, telling everywhere, all the way down to the sea, how bountiful are the clouds that fill their ample fountains. Some thirty or forty rivers have been discovered in the Territory, the number varying, as the smaller ones have been called rivers, or creeks, by the mapmakers. But not one of them all, from the mighty Yukon, 2,000 miles long, to the shortest of the mountain torrents falling white from the glaciers, has thus far been explored. Dall, Kennicott, and others have done good work on the Yukon, and miners, trappers, and traders have been over most of the region in a rambling way, and each have brought in detached bits of river knowledge, which, though too often misty and uncertain, have been put together in maps that are better than nothing.

The coast line in particular, with the mouths and lower reaches of the rivers, has been fairly drawn, but their upper courses are in a great part invisible, like mountains with their heads in a cloud. Perhaps about twenty of the Alaska rivers are a hundred miles or more in length. The Stickine is, perhaps, better known than any other river in Alaska, because of its being the way back to the Cassiar gold mines. It is about 350 or 400 miles long, and navigable for small steamers to Glenora, 150 miles, flowing first in a general westerly direction through grassy undulating plains, darkened here and there with patches of evergreens, then curving southward, and receiving numerous tributaries from the north, it enters the coast range and sweeps across it to the sea through a Yosemite valley more than a hundred miles long, and one to three miles wide at the bottom, and from five thousand to eight thousand feet deep, marvelously beautiful and inspiring from end to end. To the appreciative tourist sailing up the river through the midst of it all, the cañon for a distance of about one hundred and ten miles is a gallery of sublime pictures, an unbroken series of majestic mountains, glaciers, falls, cascades, forests, groves, flowery garden spots, grassy meadows in endless variety of form and composition—furniture enough for a dozen Yosemites—while back of the walls, and thousands of feet above them, innumerable peaks and spires, and domes of ice and snow tower grandly into the sky. Sailing along the river the views change with magical rapidity. Wondrous, too, are the changes dependent on the weather. Avalanches from the heights, booming and resounding from side to side; storm winds from the Arctic highlands, sweeping the cañon like a flood and filling the air with ice dust; rocks, glaciers, and forests in spotless white.

In spring the chanting of cascades, the gentle breathing of warm winds, the opening of leaves and flowers, birds building their nests, hundred acre fields of wild roses coming into bloom, and tangles of bramble and huckleberry, swaths of birch and willow creeping up the lower slopes of the walls after the melting snow, massive cumuli piled about the highest peaks, gray rain clouds wreathing the outstanding bows and battlements of the walls. Then the breaking forth of the sun on it all; the shining of the wet leaves, and the river, and the crystal spires of the glaciers; the looming of the white domes in the azure, the serene color grandeur morning and evening, changing in glorious harmony through all the seasons and years.—*San Francisco Bulletin.*

APPARATUS FOR REGISTERING SOLAR RADIATION.

Solar radiation is an element which undoubtedly plays considerable of a *rôle* in meteorological phenomena, and several methods have been employed to automatically register the period during which the sun is shining, the interruptions to radiation caused by clouds, etc. The Meteorological

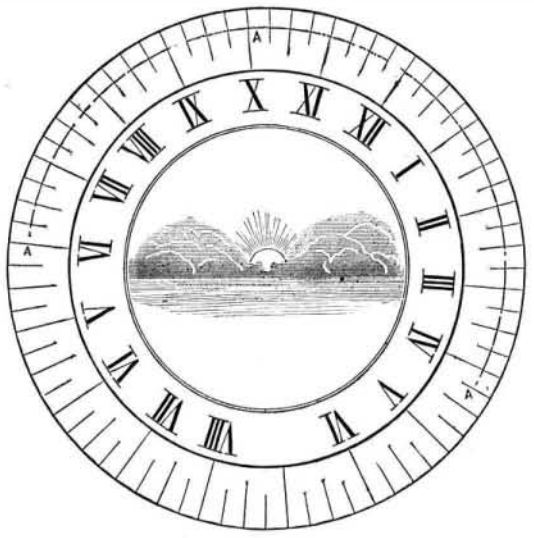


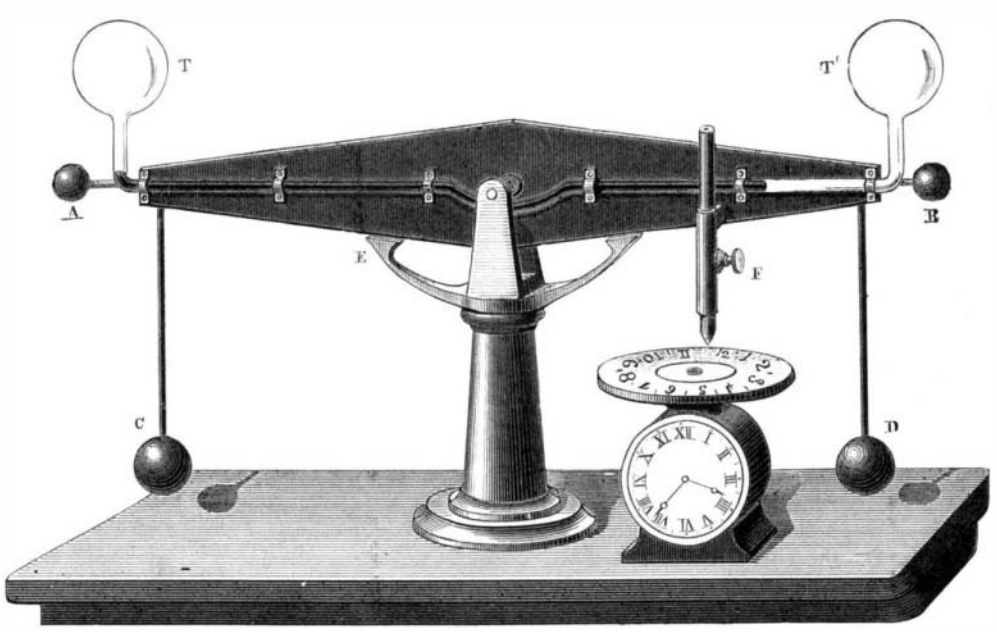
Fig. 2.—TRACING MADE BY APPARATUS FOR REGISTERING SOLAR RADIATION.

Observatory at Kew has in operation an apparatus designed for such a purpose by Campbell. It consists of a glass globe filled with water, forming a lens, and so arranged as to carbonize a strip of paper by concentrating the sun's rays when they traverse the atmosphere. An English physicist, Mr. David Winstanley, has remarkably improved on this system. His apparatus consists of a differential thermometer, T T' (Fig. 1), mounted on the beam of a balance, as shown in the accompanying engraving.

The two bulbs of the thermometer, T T', are covered with lampblack. The bulb, T, to the left is alone exposed to the open air, all the rest being inclosed in a box. When the sun shines the air contained in the bulb, T, dilates, and the mercury in the differential thermometer is driven into the tube, thus destroying the equilibrium of the balance. The beam then inclines, and the point of the pencil, which is fixed to the support, F, rests on a paper circle fastened to a copper disk. This disk keeps constantly revolving on its axis, carrying with it a paper dial like that represented in Fig. 2. When the sun is no longer shining the balance resumes its equilibrium, the pencil ceases to touch the paper, and the tracings made by it are thus broken.

In Fig. 2 the line, A A A, represents what was inscribed by the registering pencil on the 1st of September, 1879. It will be seen that the sun shone from 6 to 7:30 o'clock in the morning; and that from 7:30 to 8 o'clock clouds intervened several times, since the line is broken. In a like manner may be seen the duration and interruptions of radiation up to 4:15, when it was definitely arrested for that day. To complete the description of this ingenious apparatus we will add that the metallic balls, A B, are provided with screws, and serve to place the beam in equilibrium. The rods, C D, are made of metal, and are designed to prevent oscillation.

The tracing, which is reproduced reduced one-half, is a specimen of such as the inventor obtains at his Douglas Observatory in the Isle of Man.



APPARATUS FOR REGISTERING SOLAR RADIATION.

The New Oil Pipe Line.

Describing the oil pipe line now being pushed toward the seaboard, the Hornellsville *Times* says: Its beginning is near Bradford. It pursues a straight line to the east that, if continued, will bring it out near Catskill on the Hudson River. It may bend to the southeast to strike water at New York. It is generally considered that this line is intended to convey oil to the seaboard or some river convenient thereto. By whom it is being pushed through is a puzzle. Report says the project is advanced by the Union Tank Line Company This is undoubtedly a branch or only another name for the Standard Oil Company.

The cost of the undertaking cannot be estimated, but that it is a gigantic enterprise and will cost a vast sum may easily be shown. The tanks at Cameron Mills will cost nearly $10,000. Each of the pumps will weigh sixty-five tons, and will cost $16,000 or more. The engines will consume five to ten tons of coal per day. The pipe is wrought iron and costs $1.20 a foot. Add the cost of surveying, clearing away, laying the pipe, burying it, engine buildings, and a score of other things, and the expenditure, were it known, would seem fabulous.

A new telegraph wire has been put up along the railroad, and a report of progress at various points is daily wired to headquarters. When the line is in operation a full report of the business at each station will daily be telegraphed to the proper officials. Every length of pipe is numbered, and is checked off when put on and taken off of the cars. It is receipted for by the teamster and again by the men who lay it. Every detail in this great scheme is watched and properly recorded and reported.

Chinese Sheet Lead Factories.

The manufacture of sheet lead for the lining of tea chests is an important industry at Hong Kong. The melted lead is pressed into sheets by hand between pairs of large paving tiles smoothly covered with several layers of unsized paper. As he drops the melted lead on one tile the workman quickly presses it into a sheet with the other. The paper being a bad conductor of heat, the lead does not solidify immediately it leaves the ladle; and as by long practice the workman always ladles out exactly the same quantity of lead, the sheets vary but little either in size or thickness. The sheets are afterwards trimmed by hand with large shears.

A New Process for the Treatment of Sulphureted Ores.

A new method of treating gold-bearing sulphurets, by which such ores can be reduced, it is said, at a cost not exceeding $4 a ton, has lately been developed and tested in Philadelphia. The *Record* describes the process as follows: The ore is first passed through a powerful rock-breaker, in which it is broken into small pieces. From here it goes into a pulverizing machine, where it is reduced to grains so fine that they will pass through a sieve running 3,600 holes to the square inch. Thence it is put into the ore roaster. This is the chief feature of the process. It is composed of fire-clay retorts of cylindrical shape, built one above the other in four tiers, the entire structure being fifteen feet high, eight wide, and twelve deep. The heat in the retorts varies, the lower one being the warmest and the upper the coolest. The powdered ore is passed into the rear of the top retort, and is moved slowly along by means of a comb worked by machinery until the front is reached; thence it falls into the retort below, then moves back, and the operation is repeated until the last and bottom retort is reached, when it passes out, the whole operation consuming about four hours. By this process the sulphur is burnt out of the ores, the base metals are oxidized, and the gold is left in a free metallic state.

After this the ore, having been cooled, goes into an automatic amalgamator. Here it is treated with hot fumes of mercury, which instantly attach themselves to the precious metals and amalgamate every particle of the free gold in the ore. By the other processes numberless small pieces of gold, which have not gravity enough to attach to the plates, float away and are lost. With the use of hot mercury, however, these small particles are rolled into globules and are consequently saved. Again, when ordinarily treated, small portions of gold become coated with copper and iron, and are thus lost. In this process, however, such a coating is stripped off by the action of the hot mercury, a condition of amalgamation which is never accomplished when cold mercury is employed.

After passing from the amalgamator the ore is thoroughly cooled and then thrown into settling pans filled with water, which are kept agitated for the purpose of settling the quicksilver containing the gold. This is next placed in a retort, where the mercury is separated from the precious metals.

The Canadian Canal System.

The Canadian canal system now comprises the following sections: First, the Welland Canal from Lake Erie to Lake Ontario. Thence the route is across Lake Ontario itself to Kingston, where the navigation of the river St. Lawrence begins. As is well known, remarks a *Herald* correspondent, sent especially to study the Canadian canals, this river along its upper portion, owing to numerous rapids, is unfit for continuous navigation. Hence at various points these rapids are avoided by canals, the vessels passing back from them to the river. These are the Galop Canal, the Rapide Plat Canal, the Farran's Point Canal, the Cornwall Canal, the Beauharnais Canal, and the Lachine Canal, where the river is reached at Montreal, and ocean navigation begins. When it is remembered that the Erie Canal is 350 miles long to Albany, and has 72 locks, a table showing the superiority of the Canadian route in the matter of plain sailing will be instructive, since with 365¼ miles it reaches ocean navigation:

	Canal Navigation. Miles.	Free Navigation. Miles.
Welland Canal	27	—
Lake Ontario	—	160
River St. Lawrence	—	66⅝
Galop Canal	7⅝	—
River St. Lawrence	—	4½
Rapide Plat Canal	4	—
River St. Lawrence	—	10½
Farran's Point Canal	¾	—
River St Lawrence	—	5
Cornwall Canal	11½	—
Lake St. Francis	—	32¾
Beauharnais Canal	11¾	—
Lake St. Louis	—	15¼
Lachine Canal	8½	—
Totals	70⅝	294⅝

From Lake Erie to Montreal, 365¼ miles.

This route has only 54 locks. It can accommodate vessels of nearly three times the tonnage of those on the Erie Canal. It can remain open to navigation about the same length of time. It has 9 feet of water in the lowest of its locks, against 6 feet in those of the Erie Canal. This refers to the Canadian water route as it is.

As the Canadian water route is intended to be these already superior conditions will be greatly increased. To begin, the minimum size of the locks is to be 270 feet by 45 feet, with 14 feet of water on the miter sills. The enlargement of the Welland Canal will shorten the distance one mile, with one lock less besides. At the Galop Rapids it is proposed by submarine operations to lower the bed of the river from 10 feet to 16 feet, so that vessels descending need not pass through the Galop Canal at all. A contract has been issued for this work. The entire system of river and canal navigation is to be made available for vessels drawing 14 feet, dredging in the former case being necessary. No clear sketch of the work has been completed yet, and all the prospective benefits remain therefore unrealized.

NEW SPORTING GUN.

Until quite recently guns of the class shown in our engravings were imported, but we are now able to produce on this side of the Atlantic guns that are not only fully equal to the best English make, but also a great deal cheaper.

The gun shown in our engravings is unquestionably one of the best breech-loading sporting guns in market. It is manufactured at Colt's armory by the best and finest machinery, and is as good a specimen of mechanical work as one would wish to see. The parts are interchangeable, and so accurately made that parts of different guns may be intermixed and a gun may be put together from parts taken haphazard. The lock is of the rebounding style, and the firing pins are without springs. The entire mechanism is exceedingly simple, yet each part performs its office perfectly.

The action bolt, A, which retains the barrel in its place, is moved by a lever, B, through the medium of internal parts not shown in the engraving. This bolt engages two hooks on the barrels and retains the barrels rigidly in place.

The bolt, C, carrying the shell extractors is engaged by a cam, D, on the bolt, connecting the stock and the barrel, and when the barrel is released by drawing the action bolt, A, and tipped as shown in Fig. 1, the shell extractor is operated.

The stocks to these guns are made of any desired style of English or Circassian walnut or other choice wood, and the guns can be furnished with any grade of finish. Patterns are furnished with the guns if desired, and the guns are guaranteed to make the pattern furnished. Each gun is thoroughly tested at the factory, and none but absolutely perfect ones are placed on sale.

We have recently examined samples of these fine guns from the establishment of Messrs. Hodgkins & Haigh, 300 Broadway, New York city, who keep an assortment of them on exhibition and for sale.

FIG. 2.—LONGITUDINAL SECTION OF BREECH-LOADING GUN.

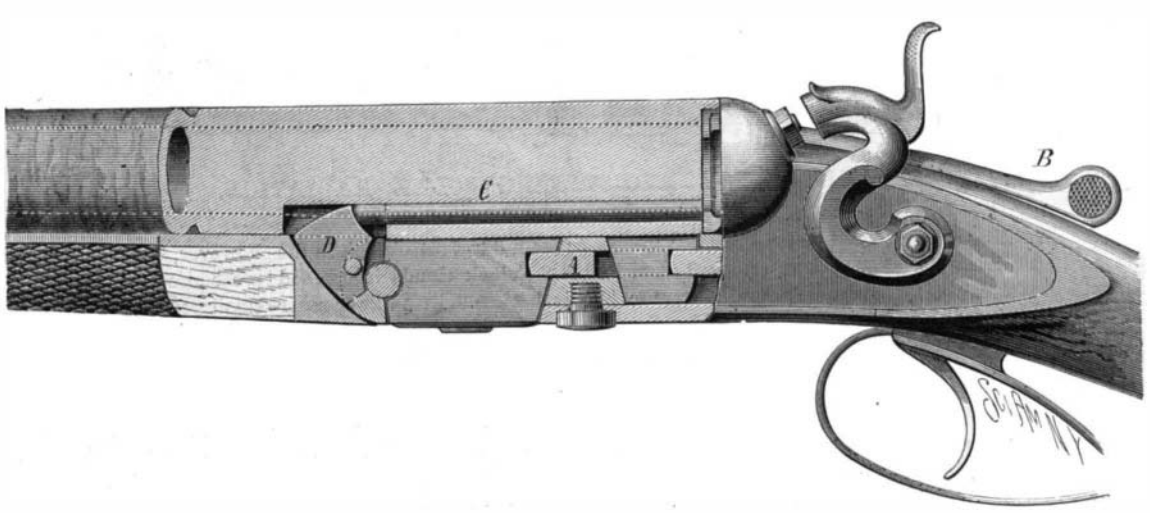
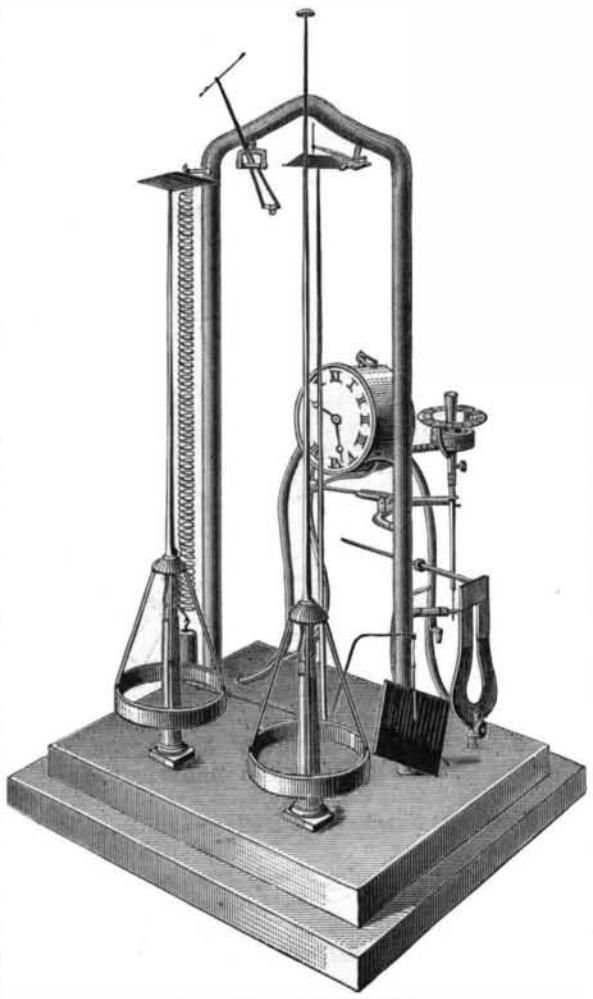


FIG. 1.—COLT'S DOUBLE BARRELED BREECH-LOADING SPORTING GUN

APPARATUS FOR RECORDING EARTHQUAKE MOVEMENTS.

The accompanying cut, taken from *La Nature*, represents an ingenious seismograph invented by M. Ignazio Galli, of the Meteorological Observatory at Velletri, Italy. It consists of six separate devices for observing and recording automatically the horizontal and vertical amplitude of earth tremors, the direction of the earthquake movement, the time of the shock, and the intensity of the attending magnetic disturbance. At the nearest corner of the marble base is a short standard of metal, on the top of which rests an agate cap, balanced by a metal ring below, and carrying above a long, slender vertical rod, the whole forming a sensitive pendulum. At the top of the rod is a small silver mirror, carrying a fine needle, the movements of which are observed through a small telescope. Any movement of the base is so magnified at the upper end of the rod that the minutest tremors of the earth are thus made visible.



GALLI'S SEISMOGRAPH.

The system next to the left is substantially the same, save that the vertical rod is shorter and carries at top a sheet of paper covered with lampblack. Resting on this blackened paper is the fine needle of a nicely balanced lever attached to the brass support which arches over the middle of the base. As the earth tremor causes the paper to move the relative extent and character of the movement are marked by the needle on its blackened surface. Behind this part of the apparatus is a weight suspended by a sensitive spiral spring. At the bottom of the weight is a lever, to the other end of which a needle is suspended by a hair, the point of the needle resting on a sheet of blackened paper slightly inclined. This is for measuring the vertical height of the earth movement. Its operation is obvious.

The direction of the movement is marked by the needle of the lever attached near the upper right hand corner of the frame, on the sheet of blackened paper on the top of the rod which rises from the middle of the base.

To ascertain the quarter whence the movement proceeds and the time of the shock, a truncated metal cone is inverted and balanced on a horizontal metal disk surrounded by a ring marked with the cardinal points. The instant the apparatus is moved the cone tips against that side of the ring whence the motion proceeds, and in falling acts upon a lever which stops the clock, thus indicating at once the direction of the source of the shock and the time of its occurrence. The intensity of the accompanying magnetic disturbance is measured by the magnet and its attachments. This seismograph is inclosed in a glass case, is small, extremely sensitive, and records the slightest tremors of the earth with great precision.

MISCELLANEOUS INVENTIONS.

An easel for holding drawing boards and other similar articles, which is so arranged that the board or other article can be set in a horizontal position or at any desired inclination, and can also be revolved so as to present the drawing or other object in different positions for the purpose of facilitating the work on the object, has been patented by Mr. Isaac Wilkins, Jr., of Greenpoint, N. Y.

An improved scarf, which can easily be changed so that either end of it may be attached to the neck band, has been patented by Mr. Werner W. Fichtenberg, of New York city. Both ends of the scarf are alike, and provided with a neck band having its end fastened to a small plate, which is pivoted to a button that is arranged to slide on a thin rod or a wire fastened to the rear side of the scarf.

Mr. John T. Rossetti, of Brownsville, Texas, has patented a pendant for a watch which can be turned in every direction and can be screwed into the watch case. The pendants made heretofore could be turned forward and backward in one direction only, and were not screwed into the case, but soldered to it, and were liable to break off.

Mr. Samuel M. Rhoads, of Jeffersonville, Pa., has patented a simple and durable shaft or pole coupling for vehicles. The invention consists in combining with the cushion of a thill coupling a box having a recess and back piece, a separate axle clip, and a screw-threaded cap having ears that clasp the box.

An improved corset clasp, patented by Mr. William McCabe, of New York city, consists in forming the hook plate with a spring tongue to prevent the accidental separation of the hooks and eyes after they have been fastened.

Mr. Charles H. O'Connor, of Brooklyn, N.Y., has patented a process for the manufacture of flexible non-inflammable paper, or for the treatment of paper to render it non-inflammable; that is to say, saturating paper wholly or partially unsized with a solution of silicate of soda of low specific gravity, and subsequently drying the paper.

Mr. John B. Weir, of Otsego Lake, Mich., has patented an improved calk plate for boots and shoes which is both simple and effective. It consists of a metal plate covering the heel and sole, provided with calks on the lower side and lugs, which fit into corresponding recesses in the sole on the upper side. It is secured to the heel of the boot or shoe by means of a countersunk screw, which takes in a threaded plate and socket in the heel.

Mr. Thomas B. Baldwin, of Troy, Pa., has patented a parlor cooking stove with two fireplaces, so arranged that the one may be used simply for heating purposes, and the other be used simply for cooking purposes.

Mr. Robert Cunningham, of Brooklyn, N. Y., has patented an improved process of ornamentation, consisting in fixing the ornament in the desired position with some suitable adhesive substance or fastening, and then pouring over the entire surface of the ornament and its support a sufficient quantity of transparent alcohol copal varnish to cover and imbed the ornament.