THE ALPINE INDICATOR.

The Alpine indicator represented in our engraving is found in Switzerland upon a hill near Aarau. This apparatus is well known to the bathers who have passed a season at Schinznach-les-Bains, for it is a classical objective of excursions. The utility of this indicator is to give the tourist the name of the mountains that he sees in the distance, and the chain of which, uninterrupted upon nearly half the horizon, forms a grand spectacle. The system consists of a semicircular table whose rounded part is turned toward the panorama, and upon which, pivoting around an axis placed in the center of the rectilinear side, there is a rule forming as it were a radius of the circumference in which the table is comprised. Upon this rule, above the pivot, there is a back sight and at the other end, near the circumference, a front sight. Upon the table, and in their respective directions, are inscribed the principal names of the mountains that are seen in the distance.

The spectator who wishes to consult the indicator must place himself on the rectilinear side of the table and face the panorama. With the rule pivoting around the axis, he will aim at the summit whose name he desires to know, as he would do with a gun, in using the breech and muzzle sights. This done, he will find a name upon the table at the side of the sight. It is that of the mountain aimed at.

The reader will readily understand how it has been possible for the maker to establish this indicator. He has oriented the table by means of a compass, and, placing upon it a map of the environs in the same orientation (the place where the indicator is found upon the map coinciding with the sight upon the table), has, by taking aim at the mountains of the horizon, been able to find them upon the map, and, reciprocally, by aiming according to the map, to find the mountain at the horizon. The result of these operations he has noted upon the table. In order to find objects nearer than the horizon, a map of the surroundings is transferred to the table. As the horizon in the present case is at 24 miles, the space between the back sight and the circumference of the table is divided by equally spaced concentric semicircles, having the back sight as their center, and the spacing of which represents a distance of three miles in a bee line. The object, say a belfry or castle, is sighted, and this is found again upon the map upon seeking it at its approximate distance along the rule. We have seen several of these tables in Switzerland, at Lucerne and Zurich, but they had no sights. The contours of the mountains had been simply drawn and the names placed beneath the corresponding points. This is much less practical.

We have seen the apparatus with sights, as at Aarau, installed upon the tower of the cathedral of Lausanne. It had been established for allowing the night watchman to recognize in darkness a village or farm in which a fire had just broken out, so that aid might be sent thereto.

Since the villages have been connected by telephone with the principal city, the indicator has no longer been used.

We have never seen these indicators in France. Perhaps some exist, but there are certainly many places where they might be put. In the environs of Paris, among others, one of these tables would not be out of place, nor would it be upon the terrace of Saint Germain or upon that of Bellevue. The Alps, of course, would not be seen, but it is not the Alps only that is worthy of interest. We believe that it would be interesting for some one who has the advantage of having a view over a wide horizon at home to establish one of these tables.

A compass, one or two official maps, a flat rule, a sheet of bristol board, and a plank are all the materials necessary.—La Nature.

THE ALPINE INDICATOR.

The Brighton Aerial Cableway.

A new cable railway across the valley known as "The Devil's Dyke," five miles northwest of Brighton, England, was opened on October 13, 1894. Telpher lines are now quite largely used for industrial purposes but a passenger line of this kind is a novelty. The steel wire cable is attached to tall steel columns. The length between stations is 1,100 feet and the span between the columns is 650 feet. The lowest point in the valley below the cable is 230 feet. Suspended from the cable are steel "anchors" supporting, 2 feet apart, two parallel wire ropes, on which the pulleys of the passenger car run. The car is drawn across by a 4½ horse power Crossley oil engine. Each car holds eight persons, and two and one-half minutes are occupied in the trip.

FIRE EATERS.

The fire eaters of whom we propose to speak, and who have been exhibiting in the hall of the Olympia, at Paris, excel in their line anything of the kind that has been seen up to the present. They not only swallow flames, but handle fire and cause it to flash from their fingers.

These fire eaters are two young Americans who have cultivated physics and electricity considerably. When they perform their experiments they are clad in a tight-fitting costume of a red color which represents that of the devils of fairy scenes. The stage upon which they appear remains but dimly lighted during the entire time of their presence thereon. At the back of it there is a piece of furniture that resembles an office desk seen from the rear, but no detail of this object is distinguishable. The devils go behind it and seem to make some preparation with their hands there, and then they come to the front of the stage and cause very thin but brilliant flames to dart from their fingers. Bringing these flames near their mouths, they seem to swallow them, and then extinguish them between their teeth.

When the two devils touch each other's hands, a crackling is heard and long flames dart forth for a few seconds from the tips of their fingers, which they continuously move.

In a subsequent experiment, without putting anything in their mouths, they blow with energy and a brilliant flame makes its exit from between their lips. They shoot forth a jet of flame for a considerable length of time, which certainly exceeds half a minute.

While these singular phenomena are occurring, the spectators absolutely smell no odor. It is probable that the combustion is due to a very volatile essence, but we are unable either to state precisely the nature of it or to give an exact explanation of the experiments performed. The red devils keep their secret, and when they are questioned remain mute.

Our readers, however, may inform themselves as to many points of these curious phenomena by reading two articles entitled "Incombustible Men" that Mr. Guyot Daubes contributed to this journal in 1886. The author speaks of jugglers who lick red hot iron rods and of eaters of lighted tow, and describes the experiments performed in 1881 by a person named Kortig, who had prepared an essence that was so volatile that he poured some of it into his hand and lighted it with out burning himself. Mr. Kortig held a seance at a soiree given at the Conservatoire des Arts et Metiers by Mr. Herve Mangon, then director.

We were invited to this soiree and saw the operator light the liquid that he had poured into the brim of his felt hat or into the folds of a lady's handkerchief without the objects serving as a support to the liquid being in any wise damaged.

For the chemist, there are here some interesting experiments to take up and study.—La Nature.

FIRE EATERS AT THE OLYMPIA THEATER, PARIS.

Exhibition of the National Sculpture Society.

The second annual exhibition of the National Sculpture Society will be held, beginning Tuesday, May 7, and continuing until May 23, in the galleries of the American Fine Art Society's building, No. 215 West 57th Street, New York. The exhibition will comprise several novel features and promises to be unusually interesting and profitable. An important feature will be a retrospective exhibition of sculpture, to which all are invited to contribute. All work of sculpture, whether exhibited before or not, will be eligible, subject to the decision of a jury of inspection.

A novel feature will be an exhibition of landscape gardening, arranged with flowers and plants after the designs of Nathan F. Barret, landscape engineer, and Thomas Hastings, architect. It is intended to show something of the possibilities of combining sculpture with flowers and plants in gardening and in interior decoration. The society will also hold in connection with the exhibition a competition for a new design for the United States silver dollar, and the plaster models presented in competition will be on view.

Two prizes of $300 and $200 are offered for the two best designs, and if any design of sufficient merit be presented, the society will urge that it be adopted by the national government. Further information may be had by application to the society.

A DIAMOND weighing not less than 971¾ carats, and said to be the largest in the world, has been found in the Jagersfontein mines, Cape Colony, by Inspector Edward Jorgansen. It was taken, well guarded, to the Cape of Good Hope and put aboard a warship for London and deposited in the Bank of England.

ONE of the most remarkable sights to be seen in Australia is a burning mountain 1,820 feet in height. The mountain is supposed to be underlaid with an inexhaustible coal seam, which in some way became ignited. It was burning long before the advent of white men to that part of the country.

Liquefaction of Gases.

At a meeting of the Astronomical and Physical Society of Toronto, Mr. Arthur Harvey, who had been requested to prepare a resume of the recent work of Professor Dewar in connection with the above subject, read the following notes:

The method adopted is to lower boiling points by exhaustion. You know the principle. It comes to our notice practically in mining at or above the summer snow line in the mountains. There are several camps in America so high that boiling water will not cook potatoes or other vegetables so as to make them palatable. Carbonic acid, which boils under ordinary atmospheric pressure at —112 degrees, will, in a vacuum such as the air pump can be made to give, boil at —166 degrees. At this temperature nitrous-oxide liquefies, and, itself boiled in vacuo, lowers the temperature and liquefies ethylene, which in turn runs down the thermometer to —229 degrees. At this point pressure is resorted to, and the pressure of 1,500 lb. to the inch (100 atmospheres) forces oxygen into a liquid state. The evaporation of liquid oxygen, also in vacuo, liquefies, under pressure, air and nitrogen, while these again, worked upon in double receivers by powerful air pumps, will produce solid nitrogen. This was first shown in January of the year 1894. Liquid oxygen is 900 times less in volume than the gas at ordinary temperatures—blue in color, because it stops many red, yellow and orange rays. That is apparently why the sky is blue. Like the gas, it is magnetic, springs from a cup of rock salt to the poles of an electro-magnet when the circuit is turned on, and stays there pending its rapid evaporation. Nitrogen seems to be an inert body, with no striking qualities, good to be a diluter or absorbent of the more energetic oxygen. Hydrogen remains now the only body unsubdued by cold and pressure, so a hydrogen thermometer is used to indicate these extremely low temperatures. If hydrogen be, as Faraday thought, a metal, water is a metallic oxide, and it is remarkable how easily this oxide liquefies, while oxygen only becomes fluid under the severest compulsion, and hydrogen resists it with success.

Gases contract $\frac{1}{460}$ for each degree of temperature. What is to happen when a temperature of —460 degrees is reached? At present it seems below the limit of possibility. All gases will liquefy and solidify before this is obtained; so the method of successive reductions above described must fail to achieve such a minimum. But if this absolute zero is reached, will matter vanish through the total deprivation of heat? Heat is the life of matter; the more heat, the more energetic the molecules. Metals become stiffer and tougher under cold—remarkably so at Professor Dewar's low temperatures—become better conductors of electrical currents; but chemical affinity is diminished, so that alloys do not behave in the same way as pure metals, while carbon and some other substances act quite differently. We know from the everyday experience of the incandescent electric light that heat increases the conductivity of carbon, while it reduces that of metals—a corollary of which property of the latter it seems to be that iron at 1,400 degrees is not magnetic at all; nickel at 340 degrees is also inert to the strongest magnets. If the sun is a magnetic center at all, it is not because of its iron or other metals, and this consideration leads me to doubt if the aurora has any connection with the spots on the sun, either as they pass the center or appear on his eastern limb, or with their maximum or minimum frequency.

What is the cold of space? We approximate to it in these experiments. Is it permissible to think that this cold—even without pressure—would liquefy and solidify gases and so facilitate the condensation of dispersed matter into suns and planets, and forbid the existence of a gas in space which would retard the motions of these orbs? Will cold, rather than gravity, thus fix a limit to the atmospheres, permitting no gas to exist outside the calorific influence of the bodies which are still hot from condensation? Has the air there was upon the moon settled down to be a transparent sheet of ice over her surface, fixing her features in an almost eternal setting as hard as adamant?

One more singular point. Molecular convection of heat ceases as the molecules die of cold, but energy still passes through the frozen mass. A burning glass which concentrates heat and light can be made with a spherical vessel full of liquid oxygen. Radiant or ethereal heat and light encounter no resistance on account of extreme cold, when molecular heat can scarcely creep from particle to particle.

Cold affects colors. Sulphur (at —314 degrees) turns white, vermilion fades to orange, iodine in alcohol loses its violet, my authority states, but as alcohol freezes at —202 degrees, the phenomenon must be seen in the solid.

Is the earth homogeneous? When it was intensely hot, too hot to hold any but elementary forms of matter, a time came when it was cooled as to its gaseous envelope, and oxygen, if not hydrogen, combined with its materials to a certain depth. The outer shell thus is alone composed of oxides or rusts, for such we may call all the rocks and other substances that contain oxygen. A time may come when the aqueous vapor and carbonic acid of the air will come down as snow, just as oxygen and hydrogen at a given stage form water, just as carbonic acid and calcium have formed the limestones—and, after that, the interstellar cold will be free to act, and the residual oxygen and nitrogen will form an ice case of eleven or twelve yards in thickness. When, in due course, something like this happens even to the sun, and absolute zero is reached, will matter be loosened from its affinities and disperse? If so, there must be fewer dark stars than Sir Robert Ball thinks possible.

Lodgings for Seamen on Ship Board.

With a view to the promotion of the health of seamen and their protection against the cupidity of owners, a new law was passed at the last session of Congress, the text of which we give below. It will be seen that the cabins must be large enough to give every man a deck space of 12 superficial feet and a total of 72 cubic feet. This is equal to a space of 2 feet wide, 6 feet long, and 6 feet high.

The act was approved March 2, 1895, and is entitled "An act to provide for deductions from the gross tonnage of vessels of the United States." The act will take effect April 1, 1895.

"Every place appropriated to the crew of the vessel shall have a space of not less than 72 cubic feet and 12 superficial feet, measured on the deck or floor of that place, for each seaman or apprentice lodged therein. Such place shall be securely constructed, properly lighted, drained, and ventilated, properly protected from weather and sea, and as far as practicable properly shut off and protected from the effluvium of cargo or bilge water; and failure to comply with this provision shall subject the owner to a penalty of $500. Every place so occupied shall be kept free from goods or stores of any kind not being the personal property of the crew in use during the voyage; and if any such place is not so kept free, the master shall forfeit and pay to each seaman or apprentice lodged in that place the sum of 50 cents a day for each day during which any goods or stores as aforesaid are kept or stored in the place after complaint has been made to him by any two or more of the seamen so lodged. No deduction from tonnage as aforesaid shall be made unless there is permanently cut in a beam and over the doorway of every such place the number of men it is allowed to accommodate with these words, 'Certified to accommodate . . . seamen.'

"That the provisions of this act apply only to vessels the construction of which shall be begun after June 30, 1895."

RECENTLY PATENTED INVENTIONS.

Engineering.

CONSTRUCTION OF VESSELS.—Marie V. T. Dubreuil, New York City. A means of forming two keels in a vessel's hull has been devised by this inventor, whereby the hull will be made stiff both longitudinally and transversely without appreciably increasing its tonnage. The vessel's sides are parallel from the stern to a little beyond the center, and thence tapered to the bowline, the bottom being tapered upwardly toward the bow for a corresponding distance. The hull comprises an outer covering and a skeleton frame of X braces, the hull bottom following the inverted V shape of the lower members of the braces, and thus forming two keels, giving a stability not attainable in ordinary methods of construction.

THE PROPULSION OF VESSELS BY MEANS OF EXPLOSIVES forms the subject of a further patent by the same inventor, the construction of the vessel being similar, but a cannon-like conductor being located at the stern, and extending from within the hull to its exterior. A rotating receiver has chambers for the explosive material, to register successively with the bore of the conductor, a trip mechanism carried by the receiver actuating the hammer to effect the explosions, which may be made to occur at very frequent intervals, as may be needed to cause the constant forward propulsion of the vessel, and without jar to the vessel itself.

A RUDDER specially designed for the form of vessel above described has also been patented by the same inventor, a rudder being pivoted to the bottom of the vessel at the bow, centrally between the keels, while a fin rudder is located at each side of the hull near the stern, the three rudders being easily operated to steer the vessel much more quickly than would be possible with a single rudder at the stern, the vessel being designed to turn almost on its center.

REGENERATIVE FURNACE VALVE GEAR.—John Kernan and Robert B. Yuille, Pittsburg, Pa. This is a simple and durable gear, easily reversed, to connect and disconnect the gas supply and the furnace and the latter and the chimney flue. Diagonal valve seats are formed in a casing, which may be water-jacketed or lined with fire brick, and which is formed with an open top and bottom and side openings, slide valves sliding on the seats so that when one moves inward the other moves outward, while a plug is held in position in one side of the casing by a weighted lever. The valves can be readily repaired while in an outermost position without stopping or interfering with the work of the furnace.

ANGLE COCK.—William J. Waldron, Fort Worth, Texas. This is a device to be applied only on a manually operated angle cock, by means of supplemental fluid pressure pipes, so that the plug cannot be turned by unauthorized persons and without the knowledge of the engineer in charge of the train. It is a device for locking the train pipe valve or plug, by means of a connection separate from the train pipe and under the control of the engineer.

Railway Appliances.

CAR COUPLING.—Thomas Gaskins, Arcadia, Fla. Two patents have been granted this inventor for improvements in couplings of the Janney type, in which the drawhead has at one side a knuckle to couple with a similar knuckle on the other drawhead, there being means of locking the knuckles rigidly in coupled position or turning them outwardly to be disengaged from each other. The first invention consists chiefly in an improved construction and arrangement of the locking lever which holds the coupling knuckle, whereby the draught strain on the pin is so reduced as to permit it to be operated by hand, even when the draught strain is on, the whole coupling being very cheap, simple, and effective. According to the other patent, means are provided for so locking the knuckles that they may be freely and easily disengaged while the draught strain is on, and there is no necessity for slacking or backing the train to uncouple.

CAR COUPLING.—Charles H. Smith, Birmingham, Ala. This inventor has also devised an improvement in couplings of the Janney type, adapting the coupling for an automatic release of the coupling jaw if the securing devices that retain the coupling drawhead in connection with the cars should accidentally be broken or become loosened, the release preventing the coupling from falling on the track, to occasion the possible derailment of a car in the rear. The improvement is simple, costs but little, and all the parts are substantial and not liable to be deranged by ordinary wear.

NUT LOCK.—Henry Hagon, West Superior, Wis. This is an improvement primarily designed as a simple and effective means of joining the ends of rails and holding the several parts from loosening under the jarring and vibrations incident to train travel, the fish plates being secured to the rails and effectively braced by grip flanges or members, so that they will always be held tightly up against the under face of the rail tread.

NUT LOCK.—Henry B. Eareckson, New York City. This improvement consists essentially of an arm pivoted on the nut and adapted to swing into recesses on the outer end of the bolt and in the nut. While especially designed as a lock on railroad rails, joints, and vehicle axles, it is also applicable to a wide range of other uses, being of simple and durable construction and positively locking the nut in place when screwed up.

Mechanical.

HEEL NAILING MACHINE.—John F. Hines, New York City. This inventor provides an automatically-acting and effective mechanism for bending the rand into the requisite shape and inserting it between the sole and the heel plate. The rand-bending device consists of a series of clips having an articulated connection with one another, a slide having a guided movement to bend the clips, as they hold the rand, around the heel-supporting plate. Spring-pressed followers, arranged between the clips and having a sliding connection therewith, engage the outer edge of the rand and force it inward from between the clip members, a cutter severing the ends of the rands, should they project in front of the heel-supporting plate.

WRENCH.—Alf L. Winge, Miles City, Montana. This inventor has patented an improvement in that class of wrenches which have a sliding jaw adjustable by means of a movable rack, to retain the jaw locked at different points on the lever bar, with means for holding the rack stationary. The improvement presents novel details of construction, affording increased efficiency without adding to the cost of the implement.

Miscellaneous.

WALL PAPER MANUFACTURE.—Paul Groeber, Rutherford, N. J. This invention provides a method of and machine for manufacturing paper having an embossed face with a water color effect. The paper is composed of two firmly united layers of pulp, one sized and the other unsized, to form an absorbent face to receive successive colors and a final embossing impression, the sized pulp sustaining the facing during the processes of printing and embossing. By this means water colors may be employed alone or in connection with the regular pigments, some of the rollers also applying gold, mica, flock, flitters, or other illuminating material, oil, distemper, or varnish pigments.

ROLLER CHUTE.—Edwin W. Fuller, No. 304 Guerrero Street, San Francisco, Cal. This is an improved and extremely simple construction for use on grades to convey sugar cane, lumber, firewood, and other materials. It consists of a series of sections pivotally connected at their adjacent ends to have a limited lateral movement, and each section having in its bottom and side walls transverse openings where rollers are journaled in plates, the plates being removably bolted to the outer faces of the sides of the chute, so that any single roller may be removed without disturbing the others. The chute is inexpensive and easily erected, may be adjusted to varying curves, is very strong, and the material thrown into it will be carried forward and downward by gravity and with but little friction.

FOLDER AND PUNCHER.—Frederick C. Mehnert, Goshen, Ind. In devices for folding blank book sections and punching holes in them, preparatory to binding, this inventor has produced a very simple machine adapted to simultaneously fold the sections and punch the holes, doing the work very rapidly and making the holes all alike. The table has in its top, parallel jaws adjustable toward and from each other to vary the width of the slot, which is entered by a vertically reciprocating folder blade having a lower non-cutting edge with projecting needles or perforating spurs to perforate the paper in the fold for the binding thread without cutting the sheets in two.

CARPET STRETCHER AND JACK.—Hosmer F. Jackson, Tyrone, Pa. This is a simple and inexpensive combination household tool, which may be used as a jack for lifting stoves and other heavy articles, or as a carpet stretcher, a removable crank arm of the tool being also adapted to serve as a tack hammer and claw. The implement is readily manipulated by any one capable of handling even the simplest tool.

DRAPERY FORM.—William H. Knapp, Brooklyn, N. Y. A form readily adjustable to a desired waist or hip measurement, and held in such position, has been patented by this inventor, the form resting upon the floor or other support throughout its entire circumference, thus dispensing with the ordinary base. The form may be worked upon without danger of toppling it over or shifting its position, and may be quickly folded up around a central standard.

BUCKLE.—Solomon Z. Quinn, New York City. Suspender buckles constitute the feature of this improvement, the buckle designed by the inventor securely fastening into the web, while it may also be conveniently unlocked to be shifted on the web to shorten or lengthen the suspender. The frame of the buckle has a crossbar extending over the web at the front, while a clamping toothed bar engages the web at the back, opposite the cross bar, the toothed bar being carried by an auxiliary frame hinged on the main frame and adapted to be locked thereto. The buckle is simple, and may be cheaply made.

CRUMB REMOVER.—James B. O. Shevil, New York City. This is a simple device for table use, having a revoluble brush arranged in front of a crumb-receiving pocket. The brush and its operating gearing are inclosed in a longitudinally slotted casing, to the top of which is pivoted a handle, the oscillation of which is limited by stops. The device is moved over the table in the same manner as a hand brush, and when lifted and taken away the crumbs held in the pocket are not liable to drop out.

THILL TUG.—William H. Cable, Staunton, Va. This is a simple, cheap and automatically locking tug, adapted to snugly embrace the thill, and readily operated to release the thill when desired. The tug holding devices are so arranged that the usual draught braces are dispensed with and the pulling and backing are effected entirely by the tug. The tug proper has a hinged member arranged to be swung up around the shaft, and be detachably connected with the other section, to which the harness is attached, and the releasing devices may be operated from the vehicle to almost instantly unloose the animal in case of a runaway.

LUBRICATOR FOR VEHICLE AXLES. Henry B. Eareckson, New York City. A nut is adapted to be secured on the threaded end of the axle spindle, according to this invention, and the nut has in its top an