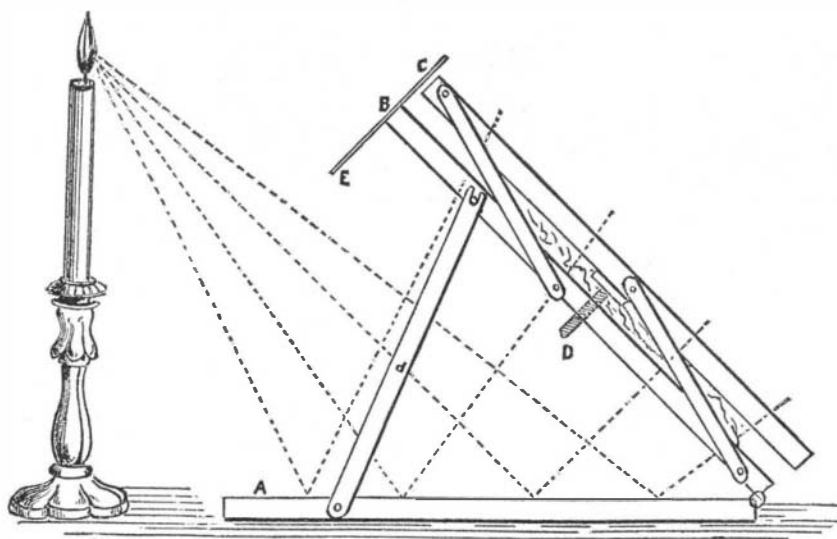


Convention of Mining Engineers.

The annual meeting of the American Institute of Mining Engineers began in Washington, Feb. 21, Mr. William Metcalf, of Pittsburg, in the chair. The opening address was delivered by Gen. Sherman, and the address of welcome by Major J. W. Powell, chairman of the local committee of arrangements. At the second morning session, papers were read by E. F. Loiseau, of Philadelphia, upon the "Process for Making Artificial Fuel from Anthracite and Bituminous Coal Dust, and the Applicability of the Process to the Utilization and Solidification of the Slacking Lignites of the West;" by W. H. Adams, upon "Coal in Northern Mexico;" by J. C. F. Randolph, of New York, upon the "New Mill for the Batopilas Mining Company;" by Henry M. Hour, upon "Comparative Efficiency of Fans and Positive Blowers," and by C. Henry Roney, of Philadelphia, upon a new ore pulverizer. In the evening, papers were read and addresses made by Gen. Meigs, Capt. Lyle, of the Springfield Arsenal, Charles MacDonald, and others on the subject of organizing systematic tests of iron and steel, the speakers generally favoring the appointment of a commission by Congress to take charge of and continue experiments with the metal-testing machine at Watertown Arsenal. During the next day's session papers were read by Prof. H. S. Monroe, of New York, upon "First Aid to the Injured;" by N. S. Keith, of New York city, upon "Electrical Apparatus and the Processes of the Mining and Metallurgical Engineer;" by Prof. Silliman, of New Haven, upon "Some Newly Discovered Mineral Regions of Southern New Mexico," and by George W. Maynard, of New York, upon "Late Developments in the Siemens Direct Process."

THE SKIAGRAPH.

A is a looking-glass laid flat upon the table; B and C are wooden frames, each holding a square of plain glass. The flower to be drawn is laid between the glasses, which can be kept at any distance apart by means of the parallel links on each side, and the screws at D. A piece of paper is laid upon the upper glass, and, by the light of a candle reflected from the mirror, the shadow of the flower is projected through the paper, and its outline can be easily traced. The paper can then be removed, and the shading and coloring copied from the object, which is held in the same position between the glasses. A skillful draughtsman may despise such aid, but it has been found useful for drawings aiming rather at correctness of shape and size than at artistic effect. The shadows will, of course, be very slightly larger than the object. The machine might also be useful to designers of Christmas cards, or floral patterns of any kind. It can easily be made with a common looking-glass and two picture frames, and a few pieces of brass wire. A cardboard screen should be placed at E to prevent the light from falling directly upon either side of the paper. Everything must have a Greek name nowadays, so we call it the skiagraph. —*Knowledge.*



THE SKIAGRAPH.

Cutaneous Eruptions Caused by the Use of Certain Medicines.

Anspitz, in his valuable "System der Hautkrankheiten," gives the following list of eruptions liable to follow the use of certain remedies. It will be a useful table for reference:

Quinine.—(a) Scarlatinous erythema, (b) morbillous papular erythema, (c) hæmorrhagia and purpura, (d) wheals, œdema, pruritus.

Cinchona, Belladonna, Strychnine, and Stramonium.—Manifestations like papulæ sudorales.

Digitalis.—Erythema after a few days' use.

Aconite.—Vesicular exanthema.

Santonine.—Vesicles, wheals.

Rhus Venenata and Toxicodendron.—Vesicular eruption.

Opium and Morphine.—Erythema, papular eruption, with much desquamation and pruritus.

Pilocarpin (?).—Augmentation of the perspiration.

Phosphorus.—Purpura.

Phosphoric Acid.—Builous eruption.

Mercury (internally).—Erythema, eczema.

Arsenic.—Erythema and papules, eczema.

Carbolic Acid.—Erythema, vesicles, or wheals.

Salicylic Acid.—Purpura, vesicles with laryngeal catarrh, wheals.

Chloral Hydrate.—Erythema (well colored), pruritus, desquamation, purpura and petechiæ, eczema with crust and scab.

Balsam Copaiba, Cubebs, Turpentine.—Vesicles, erythema, eczema.

Cod Liver Oil.—Acne.

Iodide of Potash.—Papules, vesicles and bullæ, pustules and ecchyma, eczema, ecchymoses, and purpura.

Bromide of Potassium.—Papules and pustules, deep tubercles and ecchymoses, vesicles, ulcers.—*Virginia Medical Monthly.*

Mr. Lawson's Boiler Experiments.

In June last Mr. D. T. Lawson succeeded in exploding a steam boiler of practical dimensions and containing a working amount of water by steam pressure. The experiment was described and illustrated in the SCIENTIFIC AMERICAN issues of July 9 and December 24, 1881. He has now constructed two boilers of the same type and dimensions, one

of them containing his patent device for the prevention of explosions, and the other an exact duplicate of the one he exploded last summer. The one containing the patent device has been erected at Munhall's Farm, near Pittsburg, Pa., on the site of the former experiment, and on the 17th of February a new series of experiments was commenced; but on account of the imperfection of some of the attachments they have been interrupted for a few days to perfect the arrangements and also to procure steam gauges of standard accuracy. A commission has been appointed by the Secretary of the Treasury, consisting of United States boiler inspectors, who will be present to report the results to their chief.

Duration of Wire-Cable Bridges in France.

Engineer Bernadeau has recently published an interesting note on the preservation and duration of wire bridges in France, from which the Hanover *Wochenblatt* culls the following points of interest:

From 1870 to 1879 M. Bernadeau had oversight of six suspension bridges in the Department of Lot-et-Garonne, in France. These bridges were built in 1833 to 1845. He was required to undertake a careful examination of each bridge every year. His experience gained in this manner showed that in every form of construction there are always some points which cannot be accurately tested, and hence a possible accident could with difficulty be foreseen. There were, however, some signs or indications which pointed to imperfections. For example, if reddish spots appear on the surface of the cable in places that may become wet, one may be certain that the core or heart of the cable is rusted. These reliable observations were made on three bridges, and the cables had to be renewed in consequence. The rust had attacked nearly the whole cable, and the single wires had

become so friable that it excited surprise that these bridges held together at all. At one bridge in Couthures, only 15 out of the 180 wires forming each cable were in good condition; all the rest broke like glass. These bridges had been built 33, 34, and 39 years respectively. Two bridges at Castelmoron and Caimont fell under the trial load because of the cable breaking in moist places which could not be examined. They had lasted for 25 and 28 years. The bridges at Maurin and Rayne fell during May and June, 1881, under the usual test load, after being in use 30 years. The cables of the Marmande bridge had to be renewed after 30 years' service.

From the foregoing we may conclude that the iron wire cables of suspension bridges become rusted in 30 years, so that they no longer offer sufficient security and must be replaced by others. The renewal of cables of three bridges, those of Couthures, Raissannes, and Tonneins, was accomplished in the following manner: Each of these bridges had four or five wire cables on each side, to which the suspension rods of the roadway are fastened. First, one of the cables was loosened and the strands separated, all the rusted wires cut away and taken out of the cable. The other wires were lengthened by drawing and beating with wooden hammers to remove adhering particles, then wound on spools. Strands were next formed from a definite number of wires and dipped in boiling linseed oil. The cable is made in the usual manner from strands prepared in this manner. Whatever wires are lacking are supplied by new ones, and the reconstructed cables put up again. In this way the cables can be renewed without interruption of the street traffic. Only no heavy loads can be allowed to cross, nor two teams at one time. Each bridge was tested, after being renewed, by loading it for twenty-four hours with a load of 200 kilos per square meter (40 pounds per square foot) of the road-bed.

SOUNDING-BOARD TRANSMITTER.—If a sound is produced at a certain distance from the sounding-board (? *table d'harmonie*) of a piano, it is known that this board, as well as the strings which are in unison with the sound produced, or with one of its harmonics, enter into vibration. The author finds, on applying a microphone to such a board, that the sound transmitted in a circuit containing a telephone is considerably strengthened without any alteration either in its distinctness or in its quality, and upon this principle he has constructed a very sensitive transmitter.—*M. Bourbouze.*

The Cricket's Chirp and the Temperature.

The rate of the cricket's chirp varies with the temperature, becoming faster as the latter rises. Recently a writer in the Salem (Mass.) *Gazette* gave the following rule for estimating the temperature of the air by the number of chirps made by crickets per minute: "Take seventy-two as the number of strokes per minute at 60° temperature, and for every four strokes more add 1°; for every four strokes less deduct the same." In a letter to the *Popular Science Monthly*, Margarette W. Brook gives an account of observations she made with a view to testing this rule on twelve evenings, from September 30 to October 17. Her column of temperatures, as computed by the rate of vibration, shows a close agreement with that of temperatures recorded by the thermometer.—*Nature*

Boracic Acid as an Antiseptic in Skin Affections.

Dr. George Thib, of London, emphasizes strongly the advantage of using some preparation of boracic acid to overcome the offensive odor of the feet, and gives instances in which this treatment has been thoroughly successful. In some cases he recommends the wearing of stockings and cork soles saturated with the acid. In others he prescribes an ointment, or rather a kind of glycerine cream, made as follows: A solution of boric acid is incorporated with a fatty basis of white wax and almond oil, which produce a soft, homogeneous mixture, free from the irritating crystalline plates of the crystal that are apt to separate from vaseline. He finds that this is also a very useful remedial agent for inflamed feet, as after long walking tours, and in such eczemas as are produced by the irritation of dyed underclothing.

Health of Workmen in Chrome Works.

The manager of the single establishment in Russia for the manufacture of chrome reports a curious disease among his men. He says:

"The workmen suffer from the action upon the nose of the dust of bichromate of potash, and the disease manifests itself thus:

"A little hole is formed on the partition of the nose (dividing the two nostrils), and increases gradually until the partition entirely disappears, with the exception of the lower part of it, so that to a superficial observer there is nothing the matter with the nose except perhaps a little outward depression. It must be remarked that as soon as the partition is gone the process seems to stop there, and neither the lungs, air tubes, nor throat is in the least affected. Its influence is very different with different individuals. Some workmen after having been employed for ten years at the works remain unaffected while with others the hole in the nose begins to be formed after one month's work. A general inspection of all the men at the works not long ago proved that more than fifty per cent of them had diseased noses. When the disease sets in first, the man feels tickling in the nose; a week or so after it bleeds, and in a few days more there is no uncomfortable feeling of any sort, and thus the hole is formed almost without any pain."

There are, it is said, six works of the kind in the world—three in Glasgow, Scotland, one in Russia, one in Austria, and one in this country. It would be interesting to know whether the same trouble has ever been noticed outside of Russia.

The Colorado Desert.

Mr. Joseph F. James, who spent some four weeks in traveling over the Colorado Desert, in California, gives rather an unpromising account of it in an article communicated by him to the *Popular Science Monthly*.

The desert occupies almost the whole of the large county of San Diego. It is some 150 miles long and 50 miles wide, and the Southern Pacific Railroad runs through its center. At about sixty miles from Los Angeles the railroad encounters a very heavy grade, 100 to 110 feet to the mile, and it continues for twenty-two miles. At the summit, known as San Geronio Pass, begins the descent into the desert, and every mile brings you to a more desolate country. At White-water Station, twenty miles from the summit, the desert begins in earnest. First a few flowers enliven the scene. Large *Eriogonum*, three or four inches in diameter, grow on small stalks five or six inches in height. Large plants of *Abronia maritima*, with clusters of brilliant purple flowers, spread over the ground. A little *Gilia* (*G. lemmonii*), with white corolla and yellow center, adds its beauty to the scene; and the only shrub, *Larrea mexicana*, or "creosote plant," with yellow flowers and sticky leaves and branches, reminds you of the forests you have left behind.

During the seven miles to the next station, Seven Palms, the vegetation gradually thins out. Progressing beyond this the flowers disappear, and the *Cacti* predominate; and further on these are replaced by the stunted "grease wood." Finally, even the latter vanishes, and when Dos Palmas is reached we come to a country where there is absolutely nothing in the shape of vegetation. Every one knows how a well-kept field looks when it has been plowed and harrowed and cultivated until not a stick nor stone nor weed shows itself above ground. In order to form a picture of this part of the Colorado Desert, imagine a field such as this extending for miles and miles, level as a floor, with no signs of life visible, and no indications of man's presence save the rail-

road track and the telegraph poles. Imagine the ground covered with an incrustation of alkali, which, when stepped on, breaks and lets one sink ankle-deep into soil as soft and fine as powder. Picture a gale of wind blowing over the waste, the air filled with fine particles of sand, the sun obscured, and no objects visible one hundred feet away, and you will have formed a faint idea of the worst aspect of the desert. It is hard to imagine anything so fearful as the reality; and, unless one can see the ground, and feel the sand, and experience a heat of 120° in the sun, we can have only a poor conception of the desert.

IMPROVED VELOCIPEDE.

We give an engraving of a novel velocipede lately patented by Mr. A. C. Johnson, of Martin, O., which is propelled entirely by the hands and guided by the feet. The rear axle is fixed in the hubs of the rear wheels, and turns in roller bearings on the frame. The driving mechanism consists of a train of three spur wheels, one being fixed to the middle of the rear axle, another turning in bearings on a triangular frame supported by the main frame of the vehicle, the third and uppermost wheel in the series being mounted on a shaft having at opposite ends hand cranks for driving. The bearings of this shaft are in a movable frame, pivoted on arms projecting from the top of the triangular frame. This arrangement is to admit of bringing one or another of three driving wheels on the upper or driving shaft into gear with the intermediate wheel to secure the advantage of more or less leverage over the resistance to be overcome.

The forward end of the frame of the velocipede rests upon a fifth wheel on the front axle, and the latter is connected by levers with a steering foot lever conveniently near the rider's seat. This seat is mounted on springs attached to the rear of the main frame.

All of the parts of this machine are made very light and graceful, yet strong enough to endure every-day use.

The use of four wheels gives a wide base, and the forward or leading wheels run in the regular wheel tracks of a road, giving, in this respect, a great advantage over the three-wheeled velocipede. There is also considerable advantage in running the machine by hand instead of foot, especially if the upper portion of the body of the rider needs development by exercise.

This velocipede is light running, easily propelled, and is not expensive in its construction.

IMPROVED BAND SAWING MACHINE.

The band-sawing machine shown in the annexed engraving is designed principally for cross-cutting logs into measured lengths for heading, shingles, fuel, staves, and for the various other purposes for which timber in this form is used, and by changing the carriage it may readily be converted into a saw for making lumber.

This machine is the invention of Mr. Lewis F. Kettler, of New Bremen, O., who has lately secured a patent for it.

The base of the machine, which rests upon the ground or any suitable foundation, consists of two timbers connected by crosspieces and supporting the framework which contains the upper wheel of the saw, the lower wheel being carried by a shaft journaled in boxes on the base timbers. These two wheels are covered with rubber on their peripheries, and the journals of the upper one are supported by levers, adjustable up or down by wedges entering the mortises above and below the levers.

The head block near the saw is provided with a toothed roller for moving the log forward preparatory to making a new cut, and this head block is movable only across the bed frame of the machine. The tail block is mounted on two sets of rollers and is capable of being moved either lengthwise or crosswise of the bed frame.

A square shaft running the entire length of the bed frame carries two pinions which engage racks on the head and tail blocks. The pinion carrying the rack on the tail block is movable along the shaft, but cannot turn upon it. The shaft is rotated by means of bevel gearing at the side of the head block, a crank wheel being secured to the outer end of an inclined shaft for the purpose of operating the gearing.

Power is applied to the pul-

ley on the shaft of the lower band-saw wheel. The log is moved forward by means of the lever and pawl mechanism connected with the toothed roller, and the log is carried against the cutting edge of the saw by turning the crank wheel on the inclined shaft. It will be noticed that with this arrangement both ends of the log are moved at once.

This saw, while being very simple in its construction, is adjustable in all essential parts, is easily managed, and does it with the application of a minimum of power.

Education in Iceland.

The correspondent of a Swiss journal thus writes as to this subject: "One would certainly have no trouble in finding among the corps of teachers some men of great merit, even erudite, whose obscure and modest science is devoted to study and to the good of their country, without care for renown or the reward of this world. I once asked a young Icelander, who undertook the instruction of children who, from the distance of their dwellings or the poverty of

of his purse or his land is unknown; that one sees there no police nor prison; and that for centuries one has lost the memory of every kind of crime?"

NEW INVENTIONS.

Mr. Louis Wolf, of San Antonio, Texas, has patented an improved device for pressing and drying garments, which consists in a combination, with a hollow form of the shape of the garment to be dried and pressed, of hollow half-forms, and means for adjusting the half-forms on the form and heating them.

A novel folding seat for counters, patented by Mr. James A. Reeder, of Corinth, Miss., has an arm pivoted to the bottom of an upright, and supported by the ends of one or two downwardly-inclined guide-bars. The upper end of the arm carries a seat, and, when not in use, the seat is raised up against the upright and under the counter by a counterweight.

An improved open link has been patented by Mr. Solomon Sletter, of New Cumberland, W. Va. The link is formed of two parts, which are oppositely bent to form hooks, which are diagonally flattened or faced to fit upon each other. The straight end of one part is flattened at right angles to the plane of the hook, and this flattened portion is perforated and pivoted on the end of the other part.

Mr. Asa G. Golding, of New York city, has patented an improved butter-dish, made with an interior plate-supporting flange, by which the plate will be supported out of contact with the bottom of the dish, and in a cap ring, by which the edge of the plate will be covered and concealed.

A novel corner piece for wagon bodies has been patented by Mr. Richard B. Perkins, of Hornellsville, N. Y. The object of this invention is to provide means whereby the boards of wagon or carriage bodies and wagon seats, and other similar boxes, may be securely joined at the ends to form square or rounded corners without dovetailing and without the use of nails, screws, or similar fastenings, and in such manner that the corners will be shielded and protected from every direction, the rounded corners being rounded both upon the inside and outside of the box, or only upon the outside, as desired.

Mr. Edwin M. Fitzgerald, of New York city, has patented an advertising apparatus combining a clockwork, a series of rollers carrying an endless band, and a spring-driven chain of gear wheels, the band being moved automatically through fixed distances at regular intervals.

A combined child's chair, seesaw, wagon, and swing, has been patented by Mr. Thomas C. Keeler, of Mount Holly, N. J. This invention consists of a high or table chair for children, constructed so that it may be readily converted into a seesaw, wagon, or swing.

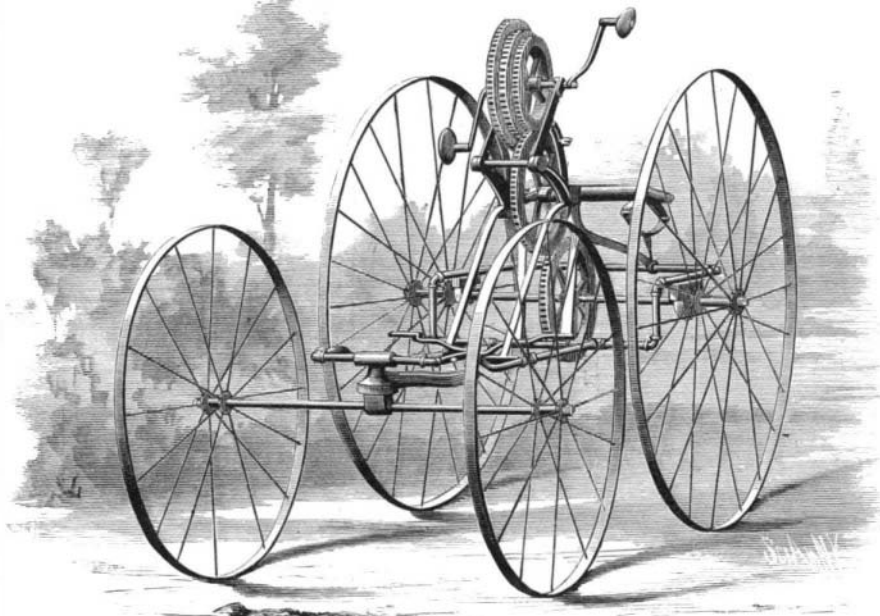
Mr. John C. Klett, of New York city, has lately patented an improved folding invalid chair. This chair is convenient for use in sick rooms, and it can be folded into small compass for transportation or for storage.

A case for clocks which is unaffected by heat, and which is practically dust-proof, has been patented by Mr. John G. Raine, of Grand Island, Neb. This clock case is intended particularly for clocks used on locomotives and in similar places.

Mr. David Thompson, of Leeds, County of York, Eng., has patented an improved kiln for bending, burning, staining, and annealing glass, burning art-tiles and pottery, and for other similar purposes. The object of the invention is to improve the use and application of gas and air so as to produce a uniform, safe, and certain result with less labor, time, cost, and liability to damage, and without the employment of additional or mechanical force or pressure to either the gas or the air.

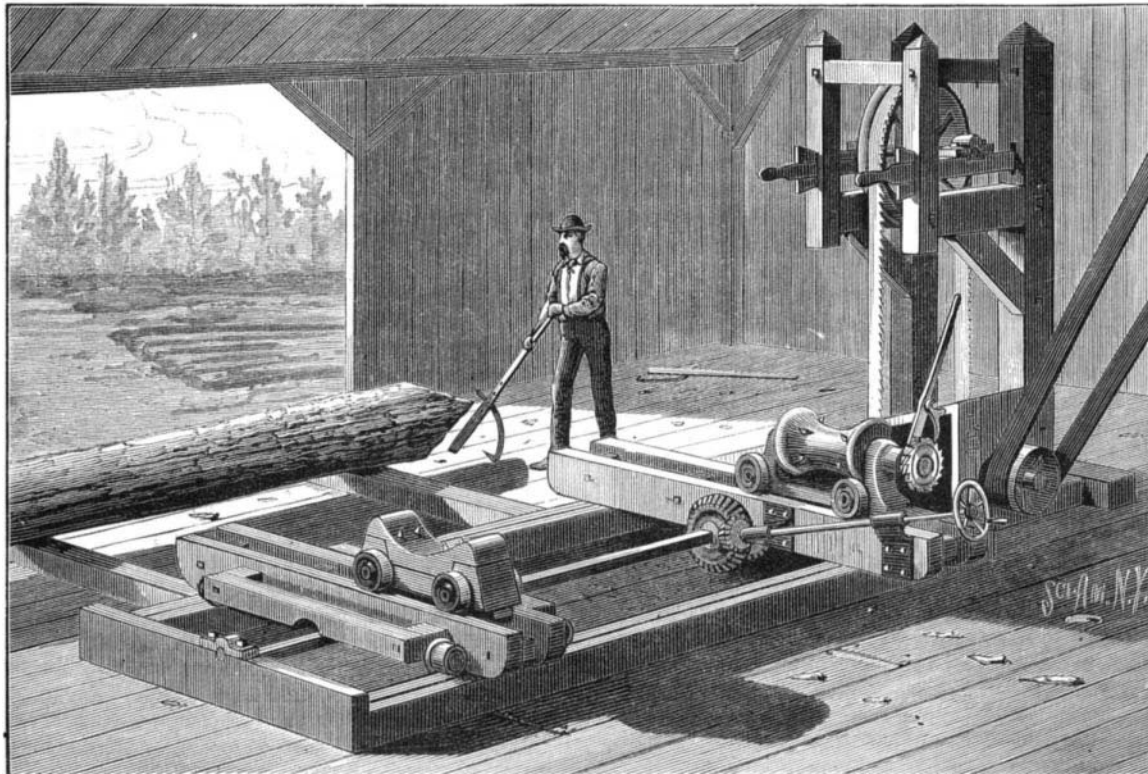
An improvement in gas cooking stoves and ranges has been patented by Mr. William W. Goodwin, of Philadelphia, Pa. The object of this improvement is to perfect gas cooking stoves so that they will utilize the heat to the greatest possible extent, thereby economizing in the use of gas fuel. This stove is so designed as to give the greatest facility and convenience for cooking operations.

An improvement in hollow tableware, patented by Mr. Henry Korf, Jr., of Cincinnati, O., consists in a peculiar manner of cushioning the bottom or the feet or legs of ice pitchers, butter dishes,



JOHNSON'S IMPROVED VELOCIPEDE.

their parents, could not attend school? 'At the age of seven years,' he replied, 'all our children know how to read, write, and cipher; among the poorest fishermen of the coast there is not one who has not received what may be called a good primary education. Our mothers are our teachers, the boer (Iceland house) our schoolroom. The nearest pastor has an oversight of the progress of the children, and that one who does not furnish the proof of a sufficient education would not be admitted to confirmation. An Icelandic mother would not survive the chagrin of seeing her children refused by the pastor, and not a single example is known of it.' Ask the first child you meet who it was that taught him or her the history and geography of his country, the name of the birds and flowers, and the invariable reply will be, *Modremin*, my mother. Touching in its simplicity and grandeur, and revealing truly the character of this sympathetic people! At twenty-five the young man is profoundly religious, chaste, gentle, and honest as on the day when at his mother's knee he was spelling out his first lesson. Can one be astonished after this that in Iceland there are neither soldiers nor cannon; that the art of robbing one's neighbor



KETTLER'S BAND-SAWING MACHINE.