

extend their system so as to reduce the supply to tenants. They propose to build additional depots in the manufacturing districts as soon as they have practically demonstrated the feasibility of their plans. The erection of the works have been retarded by the freight blockade, which detained a quantity of machinery, but if nothing unforeseen occurs an experimental test will be made next month. Pipe laying will be begun this fall, and if the winter is favorable gas will be let into the system of tubes early in the spring. Applications for supplies are already in excess of the capacity of the company to meet.

#### Cellars as Centers of Malaria.

Dr. C. R. Agnew, writing from Florida, says: In this State a somewhat new problem presents itself, in the fact that all houses should be constructed without cellars, and so raised on underpinning as to allow a clean sweep of light and air beneath them. Indeed it is a question whether such a mode of construction should not be adopted everywhere for dwellings. I have for more than twenty years believed that cellar atmosphere is a most prolific cause of disease and death. I believe that it increases seventy-five per centum the risk from malarial disease all over our country. Through this State the native population, as by an instinct, raise their simple cabins three or four feet above the ground, and allow air and light to pervade the space so made beneath the ground floor. I advise all travelers to avoid those hotels and other domiciles in the South which are not so constructed.

#### Blue Milk.

The blue appearance which milk sometimes presents after standing a few days is due to an organism which is allied to bacteria, and can be transplanted into other samples of milk and various solutions. It thrives according to the proportion of acid present and the condition of the casein; it appears after a certain degree of acidification has taken place, and prevents the further formation of acid. The casein must also be unchanged; it is then held in solution during the bluing process. The bluing occurs only in presence of oxygen, and is attended with evolution of carbonic anhydride.—*F. Neelson, in Bied. Centr.*

#### IMPROVED UNIVERSAL CHUCK.

In general construction the chuck shown in the engraving resembles the universal screw chuck, the jaws being moved



Fig. 1.—THE SWEETLAND CHUCK—BACK VIEW.

to and from the center, universally, by means of geared screws connected with the circular rack which revolves in a recess in the back plate. The front and back plates are bolted together, thus incasing and protecting the gearing.

The design of the improvement is to make the chuck independent as well as universal, and reference to the accompanying engravings illustrates the means employed to attain this object.

Fig. 1 represents the entire mechanism of the Sweetland chuck, showing plainly the circular rack and pinion screws connected at *o* and disconnected at *c*. The recess in back plate is made deep enough to disconnect the gearing. In the recess, and underneath the rack, lie the cam blocks, beveled to correspond with the continuous bevel recess in the back of rack, as shown in Fig. 2.

These bevel cam blocks have radial motion, and when moved to the outer portion of the recess and rack they connect the gearing, making the chuck universal; and when they are moved inward, allow the rack to disengage from the pinion, thus making each screw independent.

The cam blocks are held in place by the convex spring washers, *o, e, c*, which allow them to slide to or from the center without disturbing the nuts, the friction being sufficient to hold them in place.

The jaws have a long bite on the inner end, are strong in the nut, which has a full thread, and can be taken out of the chuck, for the purpose of cleaning, without removing it from the lathe. They are ground perfectly true on face and bite, also outer end, after being case-hardened.

There are lines on face designed as a guide for setting the jaws true. For instance, the chuck having been used independent, the operator wishes to use it as universal, the jaws would be moved inwardly, so that the outer end would be perfectly even with the line on face; now engage the rack into gear with the pinions by sliding the spring washers outward, and the chuck is ready for universal work, and perfectly true. This chuck has a large hole in center, and will allow a drill or reamer to pass through work without injury.

The No. 1, or reverse jaw chuck, is used for holding drills, screws, pipes, etc., and is very convenient for this class of work, also for hand tool work, brass finishing, etc.

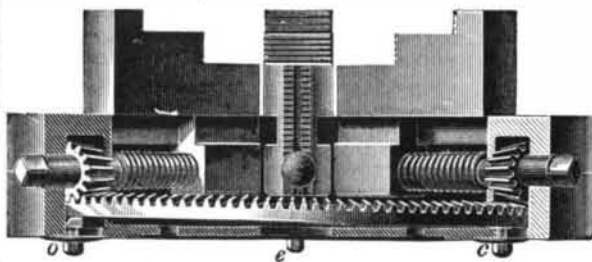


Fig. 2.—COMMON JAW.

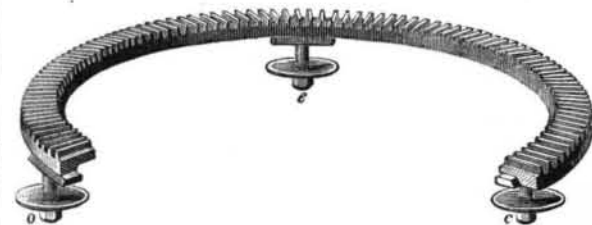


Fig. 3.—CIRCULAR RACK.

These chucks are furnished without the combination when desired, when they will be universal only. These chucks are made by Sweetland & Co., New Haven, Conn.

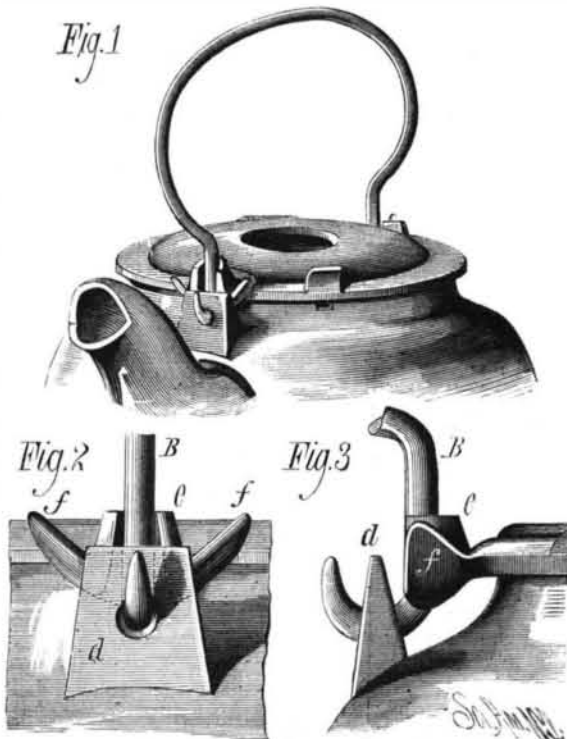
#### Good Living Easily Got.

In a recent communication to the San Francisco *Bulletin*, Mr. J. B. Rumford, of Bakersfield, Kern county, Cal., asserts that a man can earn enough there by fifteen days of "ordinary labor" to keep him in the best of food for a year. He says: "I find that three of us, a growing boy of seventeen years, my wife, and self, do not together use on an average more than one and one-half pounds of wheat or other grain per day, and though supplied with Seckel, Winter Nellis, and other pears, peaches, apples, Muscat grapes, and other fruit—not more than eight pounds of fruit per day—thus making a total expense of 2¼ cents for grain and 16 cents for fruit per day. So we have a total of 18¼ cents per day, or \$66.60 per year, or \$22.20 for each person; and as wages here for ordinary work are \$1.50 per day (if you board yourself), it would take less than fifteen days' labor to provision each one a year on a full supply of the best grain and choicest fruits, giving the best health and gustatory pleasure; and as in the experiment we used them all uncooked, the only work of preparation necessary to be performed was a few minutes' time each day preparing the grain in a steel hand-mill, not equal to more than five minutes for each person."

Living in this way all the family gained in health. Mr. Rumford adds: "I was, in two weeks, completely cured of dyspepsia, that has troubled me from boyhood until nearly fifty years of age, and my spectacles, which had become constant companions, were nearly put aside, and with them all an increase of mental if not of physical ability. Any one, from one acre well cultivated in fruits and grain, with one hour's work each day, can be supplied with a most wholesome and delightful diet of the finest fruits and continue in good health; and one hour more, well applied, will furnish good comfortable clothing. Why need it longer be said man is subject to the curse of earning his bread by the sweat of his brow?"

#### IMPROVEMENT IN KETTLES.

The annexed engraving shows an improvement in kettles recently patented by Mr. L. A. White, of Attleborough, Mass. The design of the improvement is to keep the bail cool by holding it out of contact with the body of the vessel.



WHITE'S IMPROVED KETTLE.

To accomplish this the bail is hinged in the lugs, *d*, and at some distance from the hinge is bent outward in the usual way.

A latch or fork, *e*, is attached to the lid, and surrounding the lower end of the bail and holding it so as to retain the vertical position. The latch, *e*, is provided with two wings, *f, f*, one on each side of the latch. When the bail is raised it will come in contact with these wings and raise the cover sufficiently to allow the bent portion of the bail to pass under the wings and enter the latch, *e*, when the cover will again descend and hold the bail in the vertical position.

#### A Bad Case of Globus.

Dr. Myers, of Paterson, N. J., was recently summoned in great haste, at midnight, to see a woman who was suffering the most excruciating agonies from having swallowed a set of false upper teeth, sixteen in number. Several women were about her, who had been called in to help her. Anodynes were administered to relieve her temporarily. Dr. Myers then closely scrutinized her mouth and throat, but could find no evidence of laceration. Moreover she could swallow readily. He suggested that the teeth might have been mislaid, but this was indignantly scouted by the attendants, who declared that they had searched the house from top to bottom.

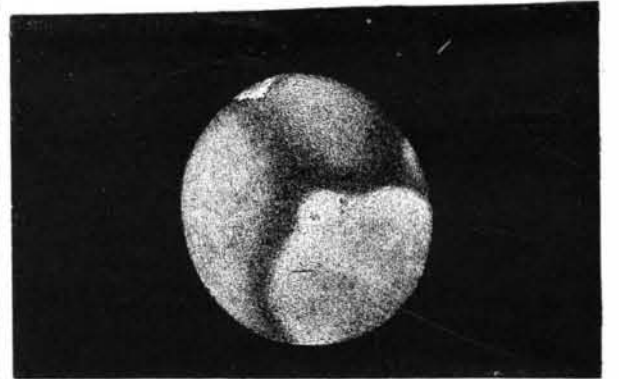
A further search under the pillow failed to disclose the missing property, and the case began to look serious, as the poor woman declared that she could not stand it any longer, as she felt the edge of the teeth cutting into the sides of her stomach. Finally, at the suggestion of the doctor, the inside of one of the pillow-cases was examined, and there the teeth were found, perfectly safe and harmless.

The patient, who had, a moment before, been suffering from the laceration of the teeth "against the edges of her stomach," recovered instantly, and the doctor was promptly dismissed.—*Medical Record.*

#### On the Probable Existence of Ocean Currents on Mars.

BY T. S. H. SHEARMEN.

The polar regions of Mars, like those of the earth, appear to be covered with a deposit of ice or snow. But there is a remarkable feature about the snow regions of Mars that has always puzzled astronomers. It is this: Their edges, instead of fading gradually as they should do if they melted by the direct action of the sun's rays alone, change in a



The planet Mars in its gibbous state, as seen on August 16, 1880, in the twenty-foot reflector at Slough, by Sir J. F. W. Herschel.

very sudden manner from snowy whiteness to an umbral blackness. The annexed sketch, taken many years ago, and when Mars was in a gibbous state, shows this appearance.

How shall we explain the absence of penumbrae to the Martial snow regions? After a thorough investigation, I venture to enunciate the theory that the phenomena mentioned are caused by the action of warm ocean currents, like our Gulf Stream, flowing from the equatorial regions of the planet. To my mind, no other rational explanation seems to offer.

Brantford, Canada.

#### Fireproof Paper and Printing.

BY L. FROBEN, BERLIN.

Paper that is actually fireproof, *i. e.*, such as can endure a temperature of 800° C. (1,472° Fah.) in combination with writing ink or printer's ink, which would endure so high a temperature without being injured, has not yet been made. Some kinds of paper made with asbestos did, indeed, resist a temperature not too high, but it was not suitable for writing or printing. According to the German *Industrie Zeitung* a method has been invented for making paper, etc., having these fireproof properties.

Asbestos fiber of the best quality is washed in a solution of permanganate of potash and then bleached with sulphurous acid. Five parts of ground or finely divided wood fiber, such as is used for paper making, is mixed with ninety-five of the asbestos. The two are then mixed with glue water and borax in a Hollander, where they are very intimately mixed and worked over into a paper pulp, which yields a fine paper with smooth surface, and can be calendered for writing. It is claimed for this paper that it will resist a white heat.

For making a fireproof printing and writing ink a mixture of platinum chloride and oil of lavender is employed. Lampblack and varnish are added to give it a black color or for a writing ink the Chinese or India ink and gum arabic are added. Good results are obtained by the use of ten parts

of pure dry chloride of platinum, twenty-five of oil of lavender, and thirty of varnish. The chloride of platinum is warmed in a porcelain capsule until perfectly dry, the oil of lavender then added, and the mixture warmed until it ceases to give off any more gas. To the black tarry mass thus obtained is added lampblack and varnish in small portions. When paper printed with this ink is ignited the platinum salt is reduced to the metallic state and remains as a brownish-black coating.

A free-flowing ink for writing on fireproof paper with an ordinary metallic pen can be made from five parts of dry chloride of platinum, fifteen parts oil of lavender, fifteen parts of Chinese ink, one part of gum arabic, and sixty-four parts of water. The platinum imparts to the writing the property of appearing transparent on igniting, so that any writing or printing that has become black or otherwise illegible will easily become legible during the heating.

Fireproof colors can be made by mixing the commercial metallic colors used on porcelain with chloride of platinum and printer's or lithographer's varnish. An ordinary aquarelle pigment can be added to strengthen its covering power. The use of a mixture of dry chloride of platinum with printer's varnish here also furnishes the basis of gay colors which are fireproof. As an example the blue color is made of forty-five parts cobalt blue, fourteen parts aquarelle ultramarine, two parts of dry chloride of platinum, and thirty-nine parts of printer's varnish.

Fireproof aquarelle colors can be prepared in a similar manner for making designs and plane tables. For this use take sixty-eight parts of the mineral color, twenty-five parts of aquarelle pigment, two parts of dry chloride of platinum, and five parts of gum arabic, or other binding material soluble in water. In preparing fireproof aquarelle colors the metallic pigments are first elutriated and then boiled with the corresponding aquarelle colors; the boiling mixture is poured into a solution of the platinum salt, and the whole evaporated, after adding the gum or other soluble adhesive material, to dryness. The pigment thus obtained is employed in the same manner as the common water colors.

P. N.

**A Trestle in Deep Water.**

A notable piece of trestle work was completed near Warm Springs, N. C., December 16. It crosses the French Broad River at Deep Water, where the water is from forty to forty-five feet deep, and runs in the main channel with a current between four and five miles an hour. Many of the timbers of the trestle are over sixty feet long. The structure is intended for construction trains and for use in building a fine (single span) iron bridge two hundred and sixty feet long, for the W. N. C. R. R. Mr. J. M. Patton, who furnishes these particulars, expresses the belief that this trestle is in deeper and swifter water than any ever constructed before. Its successful execution is due to the skill and boldness of Captain John A. Ramsay, resident engineer, and Capt. Joseph E. Frey, builder. The work has been tested by trains heavily loaded with iron, drawn by a twenty-six ton engine.

**FINGER-SUPPORTING AND EXERCISING DEVICE.**

The engraving shows a device which will assist the pupil in efforts to hold the fingers in correct position according to the American or improved system of instruction, in which the hand and fingers are held horizontally as far as the second joint.

This improvement consists in an instrument capable of ready attachment to the hand, and having suspended from as many springs overhanging the fingers five rings, which, receiving the wearer's fingers, oppose a resistance to the muscular action in the act of playing, so as to compel the user to put forth unwonted strength with the result of imparting a superior decision of touch with greater flexibility and rapidity of motion, while the fingers as far as the second joint are supported from above in horizontal position.

This invention was recently patented by Mr. Benjamin Atkins, of Cincinnati, Ohio.

**A Forty Thousand Ton Blast.**

A great blast, which has been preparing for nearly a year at the limestone quarry of the Glendon Iron Company, near Easton, Pa., was fired recently, and forty thousand tons of rock were dislodged. Four tunnels, each fifty feet long, were run into the hillside, and at their end two chambers were built at right angles, each eight feet long. Ten tons of powder were used, and when the electric current was sent along the wire, the face of the rock, for a distance of 150 feet and a height of 25 feet, was blown out like a high wave, and the rock above this excavation sank into the space with a roar.

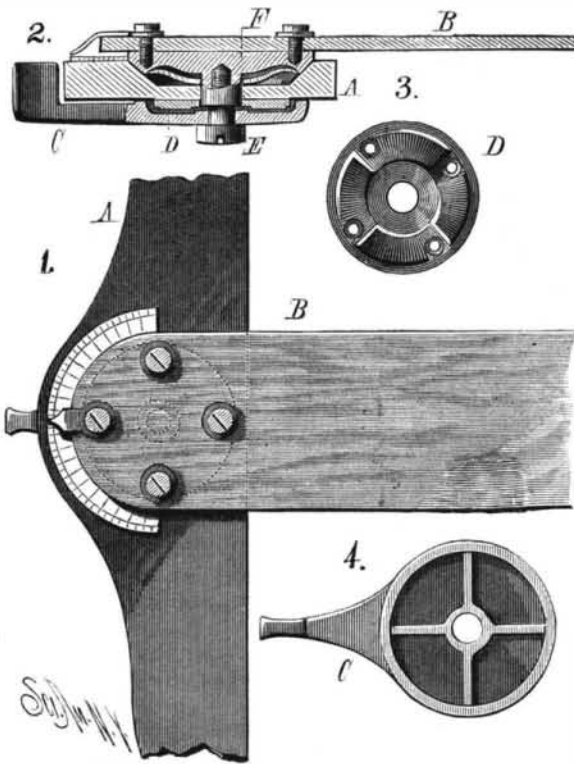
**Cornstalks as Fuel.**

An Iowa farmer, who has both coal and wood on his farm, warms his house with cornstalks, and claims that they make the best and cheapest fuel he can get. He uses a large stove, and burns the stalks in tightly-bound bundles, weighing about forty pounds each. A bundle burns three hours (without flame) in an air-tight stove. The large stove offers so much radiating surface that it does not need to be very hot. Five bundles a day, or 600 for the winter, suffice to keep the

stove going and the room warm. The farmer, Mr. Ruggles, says: "I can bind up six hundred bundles of corn stalks in two days alone. I couldn't chop the wood to warm this room in a week. Then in the spring I have a load of strong ashes for my wheat field, while my neighbors have to cut up the same cornstalks in the spring to get them away from the harrow. It makes me smile when I hear about these idiots up in Minnesota who have fifty-acre cornfields, and still go cold or buy coal. Why, I'd rather burn cornstalks than cut maple wood within sight of the house."

**IMPROVED T-SQUARE.**

The engraving shows an improved T-square, the blade of which can be adjusted to any desired angle by a simple

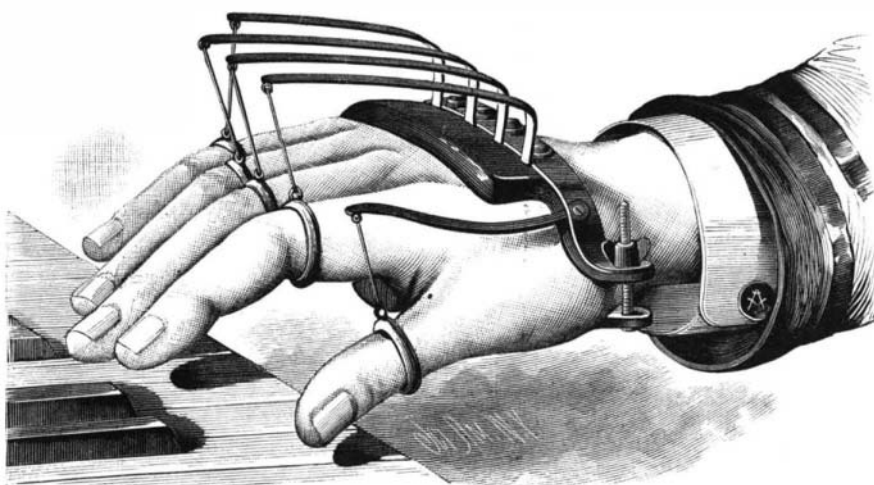


**HOERMANN'S T-SQUARE.**

mechanism without the use of a clamping screw. The blade of the square is fitted by a conically-tapering pivot plate into a correspondingly tapering recess of the head, and tightly secured in position by means of a clamping lever plate, which engages, by interior radial ribs, inclined cheeks of a plate secured to the under side of the head.

Fig. 1 is a plan view, Fig. 2 a transverse section, and Figs. 3 and 4 are views of the bottom plate of the head of the T-square and of the clamping lever plate respectively.

The blade, B, is pivoted to a central perforation of the head, A, by means of a pivot plate, which is secured to the under side of the blade. The circumference of the pivot plate is conically beveled and fitted into a correspondingly beveled recess in the head, A. To the under side of this head



**ATKINS' FINGER-SUPPORTING DEVICE.**

is secured a plate, D, having inclined cheeks, along which the interior radial ribs of a clamping lever plate, C, are moved when the plate is turned on the center pivot. The lever plate, C, turns loosely on the shank of the fastening screw, E, which is screwed into the pivot, a spiral or flat friction-spring being preferably interposed between the pivot plate and the recess of the head of the T-square for preventing any rattling. By turning the lever plate, C, in one direction its interior ribs move upon the inclines of the bottom plate, D, and draw the blade, B, into frictional contact with the conical recess of the head, 'so as to secure it tightly in any desired position. By moving the lever plate in the opposite direction the blade is released for adjustment on the head. In the better classes of T-squares a graduated scale may be arranged on the head, so as to set off any desired angle by means of a pointer secured to the end of the blade.

This invention was recently patented by Mr. Arnold Hoermann, of Hoboken, N. J.

**RECENT INVENTIONS.**

An improved trunk or valise, which can be increased or decreased in size as circumstances may require, has been patented by Mr. Franz Protzen, of Stargardt, Prussia, Germany. The invention consists of a valise or trunk constructed with stiffening frames, to the outer edges of which strips are pivoted which can be swung outward and locked in this position to form extensions of the frames and for stiffening the flexible or folding part of the covering of the valise or trunk, whereby the size of the trunk or valise can be decreased or increased by folding these pivoted strips inward or outward.

An improved meat hanger, patented by Mr. John Lawson White, of Wakefield, Va., consists in a rod provided with a straight part, having a pointed end and upwardly bent end pivoted at one end to the end of a hook adapted to lock with the straight pointed portion which receives the meat.

An improved device for stopping horses has been patented by Mr. Gumbersindo Villar, of Santander, Spain. This invention consists in the application of a device for closing the nostrils of the animal more or less when required, the device used being a curtain, fitted to be drawn down over the nostrils by a cord running parallel with the reins.

An improvement in oil stoves has been patented by Mr. Hubert S. Goffee, of Brockport, N. Y. The invention consists in combining two circular rotary plates with wick tubes arranged eccentrically therein. When it is desired to use the wicks at two different points—as, for instance, to heat two different vessels at a time—or when only one flame is needed, the disks are arranged so as to place the tubes of one disk at the greatest distance from those of the other. By rotating the disks in their seats the tubes of one disk are placed in close proximity to those of the other, so as to concentrate the flame from all the wicks at one point or under one vessel.

Mr. Cyrus R. Howard, of Huntingdon, Pa., has patented an improved draughting instrument which consists in the combination of a marking arm, a post carrying numerous figure plates, and an adjustable finger carried by the marking arm for engagement with either figure plate.

An improvement in fences has been patented by Mr. Rivers Donaldson, of Tiptonville, Tenn. In constructing this improved fence short posts are set in the ground, and to the opposite sides of their upper ends are bolted the lower ends of two uprights. Fence panels are then placed upon the upper ends of the short posts with their overlapped ends between the uprights and secured in place by bolts passing through their corner and the upper ends of the said uprights. To the upper ends of the short posts is secured a barbed wire to fill the space between the lower edge of the panels and the ground.

**Chewing Gum.**

Forty thousand dollars' worth of chewing gum is gathered in the State of Maine every year. In Oxford county is a man who makes it his business to collect spruce gum. Every year he buys from seven to nine tons. The gum is found chiefly in the region about Umbagog Lake and about the Rangely lakes. A number of men do nothing else in the winter season except collect gum. With snowshoes, ax, and a sheboygan, on which is packed the gum, they spend days and nights in the woods. The clear, pure lumps of gum are sold in their native state, the best bringing one dollar per pound. Gum not immediately merchantable is refined by a peculiar process. Sieve-like boxes are covered with spruce boughs, on which is placed the gum. Steam is introduced underneath. The gum is melted, strained by the boughs, and then passes into warm water, where it is kept from hardening until the packer takes it out, draws it into sticks, and wraps it in tissue paper, when it is ready for market.

The gum meets with a ready sale. There is not a village, town, or city in Maine where it is not in demand. One dealer last year sold fourteen hundred dollars' worth. In the large mill cities gum has a free sale. In Biddeford, Lewiston, Lawrence, and Lowell, the factory girls consume large quantities. It is said that in the lumber camps gum is used as a means of extending hospitality. After meal time

the host fills his own black clay pipe, and hands it to his guest. Later, clear lumps of spruce gum are placed before the visitor, and he is asked to take a chew. Maine produces forty thousand dollars' worth of gum in a year, some of which finds its way to this market, from which it is distributed to the various outlying factory villages, where, as stated before, it is in good demand. Spruce gum is adulterated, and those who adulterate take the trouble to fashion the pieces of gum to appear like those taken in a pure state from the trees. The ingredient of adulteration is supposed to be the gum of the pine tree.—*Providence Journal.*

**New Tablet.**

The Albany (N. Y.) Perforated Wrapping Paper Company are making a new article of stationery, consisting of a writing tablet to which is attached a roll case containing a roll of paper, which is drawn out upon the face of the tablet ready for use as fast as wanted.