

Up to within a short time previous to his death he was still engaged to the extent which his advanced though vigorous age permitted, in the study of the *Agarics*, which had been a favorite one from his youth. The persistent energy of this venerable worker is a fresh instance proving the truth of the common saying that students of nature and of science always die in the harness.

IMPROVED NUT LOCK.

We illustrate this week a simple, inexpensive, and easily adjusted nut lock.

It is hardly necessary to state that mechanics in all branches of labor have long been troubled with nuts jarring or shaking loose. By this device all trouble from this source is at once obviated. Its merit arises from a simple adaptation of the property inherent in all metals in a cold state, whereby by pressure they conform to the shape of a mould constructed of a substance harder than the metal compressed. A nut prepared as indicated in the engravings can be locked, unlocked, and relocked without removing it from its bolt, and if, by reason of shrinkage in the material bolted, it is necessary to tighten a nut, it can be done, and the nut relocked at will.

For carriages, sleighs, and vehicles of all descriptions, for agricultural implements and locomotives, for car trucks, looms, and machinery of every kind, to securely fasten lag bolts and fish plates, in fact, wherever a nut is used or can be used, there this device can be applied, and as the soft metals used (copper and tin and their alloys) are not readily oxidized, these nuts can be employed where there is a continued or intermittent submergence in salt or fresh water without injury. If desired, the nuts are so prepared that after locking the surface of the soft metal will be flush with the upperface of the nut; this form is for use where unshrinking substances are to be bolted together, and the nut is unlikely to be required to be unlocked. The nuts are prepared for locking, and can be used or not at will, the hole through the nut being countersunk at both ends, thus preventing the soft metal from unintentional displacement.

Fig. 1 represents a nut with a vertical hole through it, filled with soft metal, to be driven into the serrations of the washer.

Fig. 2 represents a carriage bolt and nut, with a horizontal hole through the nut, filled with soft metal, to be driven into the notches in the thread of the bolt.

Fig. 3 represents a portion of material bolted, serving as a washer, the locking in this instance being effected, as shown, upon the head of the bolt.

Fig. 4 shows a cross section of a bolt and nut, with a soft metal plug extending through the nut; the end of the hole adjacent to the washer may be more or less countersunk, and thus a larger or smaller bearing may be had on the washer, as desired, without weakening or injuring the nut. The merit this lock nut possesses lies in these facts, that nothing is required externally to convert ordinary nuts into lock nuts, and that the device can be applied to bolts, washers, or nuts wherever in use, at a trifling cost. Nuts, bolts, or washers prepared under this patent for general or special service can be furnished in any quantity desired, and any further information will be given upon application to Daniel Cushing & Co., Metal Workers, Lowell, Mass. Patented December 11, 1877.

Communications.

A New Motor Wanted.

To the Editor of the Scientific American:

The recent Barclay street explosion brought out a list of similar occurrences, all of which go to establish the simple fact, that finely divided matter of the combustible sort, when intermingled with air in certain proportions, forms an explosive that only requires ignition to demonstrate its power. This hitherto inutilized motive agent, if properly developed, may perhaps be made available in one way or another.

It is not unreasonable to suppose that wood and various kinds of combustible refuse, when reduced to impalpable powder, might be utilized in an engine of special construction, contrived to introduce into an explosion chamber a certain quantity of the powdered combustible and air.

We are all familiar with the gunpowder engine, the gas engine, and the more recent hydrocarbon engine. These are examples of the successful application of explosives to the propulsion of machinery, and we see no reason why wood and other combustibles, instead of being burned under boilers, should not be reduced to the proper state and exploded in a suitable engine, so as to be available as a source of power.

It remains for our inventors to develop and bring out this motive agent, and to devise a motor adapted to its use.

GEO. M. HOPKINS.

Proposed Change in Locomotive Strokes.

To the Editor of the Scientific American:

In the SCIENTIFIC AMERICAN of March 9 and March 30, 1878, I notice articles on "Locomotive Strokes," by Messrs. F. G. Woodward and John A. Holmes. As to Mr. Woodward's suggestion, permit me to state that there would be no advantage whatever gained by his proposed change. The

work, in foot pounds, performed by any steam engine in a given time is obtained by multiplying together the mean pressure per square inch on the piston, the area of piston in inches, and the number of feet traveled by the piston in the given time.

For example, if we assume a 16x24 inch cylinder, with a mean pressure on the piston of 40 pounds per square inch, the work performed per stroke is $40 \times 201.0624 \times 2 = 16,085$ foot pounds. Now, it can be readily seen that the proposed change would simply result in dividing the above product by 2, and at the same time multiplying it by 2, which would leave the amount of work per stroke unaltered. Of course the time required for one stroke of the piston must be the same in both engines, as we have assumed above, otherwise the power of the two engines would not be the same. On the other hand, there would be the objection of increasing the wear on the piston in consequence of its increased travel.

C. A. SMITH.

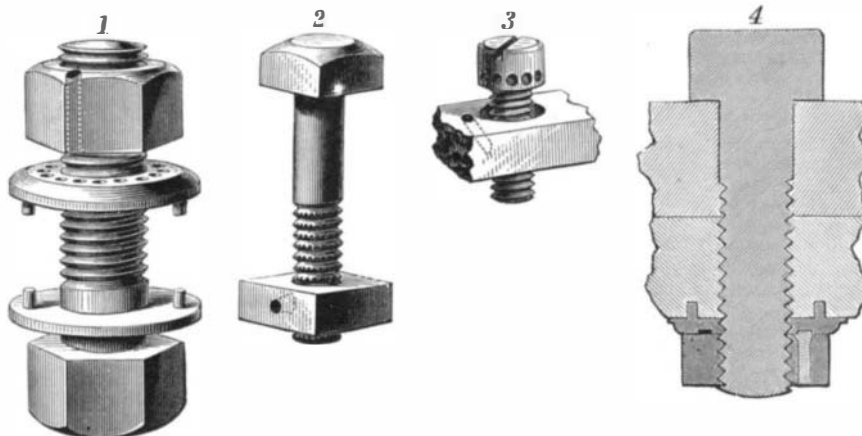
Columbus, O., March 27.

Cinders in the Eye.

To the Editor of the Scientific American:

I have often tried the remedy of putting flax seed in the eye for cinders, as suggested in your last issue, and have often found it efficacious, but too slow. I never knew the seed to cause irritation. They are inserted more easily when the patient is lying down or has his head well back, and must be put under the upper lid, else they will fall out. Another method, which I have never seen used by any one else, but which I suppose is used, is to fill a small sharp nozzle syringe with warm water, raise the upper lid from the ball, point the syringe under the lid at the outer corner, and shoot a jet toward the inner one. This is usually very effective.

A third way, common with medical men, can be easily practiced by any one. Let the patient look down (having



IMPROVED NUT LOCK.

the head thrown back), and let a person standing behind him turn the lid over a pencil or any small instrument; a nail will do. The offending substance is at once brought to light, and can be removed with a bit of cloth. Rest and a soothing wash usually complete the cure. Substances imbedded in the cornea or sclera are, of course, subjects for surgical treatment.

H. G. CHASE, M.D.

New York, March 28.

New Inventions.

An Indian Club, invented by Mr. E. M. Folk, of Brooklyn, N. Y., is of the ordinary shape externally, but has in its larger end a cylindrical chamber, in which are fitted a series of removable weights, held in place by heads and spring bolts.

Mr. F. M. Smith, of Vermilion, Dakota, has patented a device for Catching and Carrying Hogs, which consists of a cage having a detachable bottom, sliding end panels, and transporting handles.

An improved Specie Purse has been patented by Mr. J. C. Rundlett, of Portland, Me. It is made of flexible material, has a deep pocket for containing coin, and a shallow pocket which folds over the deep pocket, and has a space between the two pockets for exhibiting the contents.

An Automatic Fire Alarm, the invention of Mr. J. M. de Célis, of New York city, has a spring-acted arm carrying a button, which makes electric connection or otherwise rings a bell or explodes a gun, and which is retained by a block of wax, tallow, or other material melting at a certain temperature.

A Steam and Fume Box, invented by Mrs. E. Delong, of Stone Church, Pa., is intended to be placed on the top of a stove to collect the steam from cooking vessels, preventing the steam and odors from escaping through the house, and keeping the food warm after being cooked. It is provided with sliding doors at the top and sides.

Mr. W. H. Savage, of Kingston, Ontario, Canada, has invented an improved Brush Bridler, formed of an adjustable metallic band, clasping the brush by means of hooks fitting into slits, and having straps suitably secured to the plate which rests upon the brush head.

Mr. F. H. Trenholm, of Charleston, S. C., has patented a Cart Body, constructed so as to prevent the contents from being lost or stolen. It is furnished with a cover hinged at its forward end, and at its rear end provided with a hasp, which passes over the tail board and is secured by a staple at the bottom of the cart body. The tail board is in two

parts, and is hinged in such a manner as to give access to the top, bottom, or sides of the body, as desired.

An improved Cigar Package, designed to retain the flavor and moisture of cigars under all circumstances, has been invented by Mr. Pierre Cauhapé, of New York city. It consists of hermetically sealed and moisture-proof envelopes or capsules of gelatinous material, preferably a mixture of gelatin, honey, and gum arabic.

Mr. W. A. Miller, of Rigdon, Ind., has patented a Wash Boiler in which a continuous circulation is maintained by means of an adjustable and perforated central tube, which conveys water and steam from below a false bottom and projects them upon the clothes.

An improved Animal Trap has been invented by Mr. J. A. Palmer, of Noble, Ill., by which each animal killed is removed from the trap, and the trap automatically reset. A revolving arm, actuated by a spring, delivers a blow upon the head of the animal in such a manner as to eject the latter, and a drop pawl resets the trap until the spring has run down.

Mr. E. Wilson, of Otto, N. Y., has invented a Spring Back for Vehicles, which is capable of being adjusted as to the height and tension of the supporting springs. It consists of a second back supported on adjustable side spring arms, and on C shaped rear springs, which admit, on being turned, the raising or lowering of the back.

An improved Kitchen Table, invented by Mrs. Josephine Bliss, of Primghar, Iowa, has a number of boxes with hinged lids arranged along three sides, and a moulding board fitted into the space between the boxes. Sliding grates are arranged at each end, and drawers below the table.

Mr. G. H. Gerken, of New York city, has made certain improvements in the construction of Windows, intended to permit cleaning the sashes without removing them or necessitating reaching outside of the window. The sashes are centrally pivoted to end strips, so as to be turned on the pivots, and the joints of these end strips with the sashes are covered by hinged face strips.

A new form of Oil Stove, in which a number of original details are introduced, has recently been patented by Mr. H. L. Howse, of Sacramento, Cal. The manner in which air is led to the wick tubes is claimed to insure steady combustion and prevent the flame from being affected by cross currents.

An improved Heating Drum, for supplying a constant current of warm yet pure air to rooms, has been invented by Mr. W. A. Swaren, of Robinson, Ill. The air chamber has a series of alternating shelves, through which the air circulates, being admitted at a side opening and conducted upward to the registers. The passages for the smoke and gases of combustion are separated from the air chamber, but so arranged as to heat the air chamber effectively.

Improvements in the Running Gear of Wagons, for the purpose of obviating the strain caused by passing over uneven roads, are the subject of a patent recently issued to Mr. Wm. Ulrich, of Madison, N. J. The forward axle is made with rounded projections having a V shaped slot, into which enters the square lower part of the king bolt, thus permitting the axle to tilt without affecting the cross bar of the fifth wheel and the head block.

Mr. A. C. Fuller, of Middletown, N. Y., has patented a new Hat Folding Device, for producing hats known to the trade as "telescope" hats. It consists of metal bands, a receiver or die, heated by steam, and a rubber block operated by a follower, in an ordinary press.

An improved fastening device for Hat Mirrors, by means of which the mirror may be readily attached to the inner surface of the crown of any hat, has been invented by Mr. F. J. Hoyt, of New York city. A plate cemented to the back of the mirror has a boss, in which is a countersunk screw hole for receiving a screw which fastens the mirror to the hat.

One of the Highest Mountains.

According to recent geographical surveys, it seems that the Aconcagua Peak is the loftiest of the Andes range, and the highest in America. It is 100 miles east of Valparaiso, and nearly in latitude $32^{\circ} 30'$ south. Its actual height is not accurately known, but the measurements made by M. Pissis and other noted scientists make it reasonably certain that the elevation is between 22,400 and 23,900 feet above the waters of the sea. The French explorer made it 22,422, or four miles and 1,302 feet over, which would be 998 feet higher than the snowy summit of Chimborazo, as Humboldt measured the latter, when in 1802 the great German made his famous ascent of that mountain with Bonpland to a height of 19,286 feet. Aconcagua, seen from the Chilean seaport of Valparaiso, is shown only as a peak, towering above the other heights of the Andes at a distance of 100 miles or more inland, toward the sunrise. Aconcagua has been called an extinct volcano, but the best examinations yet made of its summit do not appear to bear out that idea. The recent observations make the height of the Chilean mountain 23,200 feet, and "probably" over that figure. The elevation of Mexico's highest mountain—Popocatepetl, or "Smoking Mountain"—is nearly 5,000 feet less than that of the Chilean peak, and Mount Shasta and Mount Hood fall short to about the same figure. Pike's Peak is about 9,000 feet lower than Aconcagua.