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### Communications.

#### Coal Dust Fuel.

To the Editor of the Scientific American:

Since writing an article for your paper on "Coal Dust as Fuel" I have been in receipt of numerous inquiries as to the *modus operandi*. I think with your correspondent, Mr. C. J. Sanborn, of Massachusetts, that plenty of boiler room, also grate and heating surface, is a prime necessity. Care should be taken to keep all surface exposed to the action of the fire and heated gases as free from soot and ashes as possible. A careful watch should be kept of the inside of the boiler as well as the outside, as with a forced blast it does not answer to allow the scale to fall from the tubes and collect over the fire, as the consequence would be a burned sheet in a very short time. In regard to the grate, I use a flat grate, each bar being about 3 inches wide by 4 feet long, having 2 slots  $\frac{1}{2}$  inch wide and 1 inch long to the width of the bar, and about 2 to the foot of the length of bar. I allow  $\frac{1}{2}$  inch space between bars for expansion, and 1 inch in length, which I find sufficient. I have 16 square feet grate surface, and use a No. 2 Sturdevant blower, which gives plenty of blast. I do not quite agree with Mr. A. F. Upton, in your issue of February 2, as I have never known the "fine particles of fuel to be blown out of the top of the chimney," neither do I "melt the fuel on the grate," for, if there is plenty of boiler room, there is no necessity of giving it blast enough for that. In regard to the injury to the boiler I fully agree with him, but I think the saving in fuel will doubly cover that loss. I prefer to use the dust free from coal, as my experience is that I can burn fuel much more economically than with it, with less trouble, as the two fuels require different treatment. One peculiarity of dust is that I can run the steam up while cleaning the fire, whereas with coal the tendency is to run it down. Another is that I can keep fire and steam much longer than with coal, frequently keeping it from 4 P.M. Saturday till 6 A.M. Monday, and in several instances till Tuesday, not touching the fire in the meantime, and keeping steam up from 25 to 50 lbs. I use dry live steam to blow out boiler tubes, which (with dust) requires to be done two or three times weekly. There is another point which I have found materially to affect the steaming of my boiler, namely, keep the chamber back of bridge wall deep. I find that with the back from  $3\frac{1}{2}$  to  $4\frac{1}{2}$  feet deep I do not have to fire nearly as hard to keep up steam; I carry just as thick a fire with the gate in blast pipe half closed as I can, and keep the steam to 60 lbs., then, if an extra quantity of steam is wanted, open wide the blast pipe, thin down the fire, and I have plenty. If I want all that the boiler can make (which I very often do for an hour or two in very cold weather) I carry a thin fire full blast, and rake and stir the fire every few minutes. At night, just previous to shutting down, I rake my fire, cleaning it well, then cover with fresh fuel, only letting it get well warmed up, shut all dampers, and leave for the night. The heat from the walls of furnace will hold the steam about stationary. I usually have from 40 to 60 lbs. the next morning, and in from 5 to 10 minutes after starting the blower as fine a fire as any one would wish. My grate bars have been in two and one half years and are as good as ever, which, as you can see, is a great saving in grate bars alone.

Milford, Conn.

WALTER F. SAGE.

#### Making Wooden Pulleys.

To the Editor of the Scientific American:

A pulley over 24 inches in diameter should be built on a spider; all under that size can be made on a wood center-piece about 2 inches thick, having a cast iron flange, say 8 inches in diameter, for a 20 inch pulley, with a hub and boss about 3 inches long. Four bolt holes should be made through the flange for bolting to wood center. The latter should be a nice fit on the shaft, with key seat the same as for an iron pulley. After preparing the centerpiece by planing smooth and straight, make a templet, the length being about one sixth or one eighth of the diameter and 2 inches wide. By this mark out the amount of stuff for the required width of face. The lumber should be about seven eighths or 1 inch thick, sawed out to the same circle as centerpiece. Plane straight and smooth, and make the butt joints a perfect fit; glue and nail on. If a flange is desired on each edge to keep the belt from running off, make the outside layer a little wider and allow it to lap over the face. Put the pulley into a lathe and turn it up. Thus made, it will be durable and will not easily break.

B. J. DONAWAY.

Terre Haute, Ind.

#### Preventing Collisions at Sea.

To the Editor of the Scientific American:

In regard to preventing collisions at sea, I would suggest the following plan: Each vessel could carry four different colored lights, say red for north, white for east, green for south, yellow for west; a set of these lights on each side of the vessel. If a vessel was going north it would hoist a red light; if going north-northeast, it would hoist one light under

the red; if going northeast, two lights under the red; if east-northeast, three lights under the red; and so with east, south, and west, the white, green, or yellow lights could be raised, and the number of lights under them as the vessel is sailing points to the right of the direction for which the top light stands for. During fogs, when the whistle has to be used, one long blast could mean north; two, east; one short and one long, south; two short and one long, west; and as many short blasts as the vessel is steering points to the right of any of these points.

Eagleville, Ohio.

L. A. OSBORN.

#### The Bicycle vs. Pedestrianism.

To the Editor of the Scientific American:

G. O. A.'s question in regard to the bicycle in "Notes and Queries" I should like to answer in the affirmative. The third time I rode a bicycle on the road I ran twenty miles over a rough road. Several hills were ridden over, and three very steep ones surmounted on foot, and yet my actual running time was two hours and a half. To have walked the same distance would have taken me at least four hours and a half. In regard to the exertion required, I can say that on this occasion, though somewhat tired, I was neither lame nor blistered, *sequela* which, I am sure, would have resulted from a walk of twenty miles.

This ride is, of course, a very inferior performance for a bicyclist, but is cited merely to show what can be done by one who was in bad condition for athletic exercise, and by no means an expert rider on his bicycle. X.

#### A Brilliant Meteor.

To the Editor of the Scientific American:

A meteor was observed by the undersigned last Sunday about 7:53 P.M., more brilliant than Venus, moving slowly from the direction of Andromeda southeasterly, and passing but a few degrees below Mars toward Canopus. The color of the light was white, and its brilliancy for the space of about 30 degrees observed remained uniform, traversing through that arc in about 3 seconds of time. No visible tail remained, though the sky was very clear and dark, but sparks apparently followed the meteor only for about a degree or two. The sparks denoted an apparently spiral movement.

New York.

R. D'HEUREUSE.

#### Influence of Petroleum on the Compass.

To the Editor of the Scientific American:

I find from my own experience, and from information derived from others engaged in the trade, that the compass needle deviates greatly when a ship is loaded with petroleum, either crude or refined. And I have always found the deviation easterly on many voyages, and have never known a case where it was otherwise. The compass in use on my vessel, on my late passage with oil from Philadelphia, was a Ritchie's patent, and the deviation was  $11^\circ$ , or nearly a point. Is it the oil, or is it the immense number of iron hoops on the barrels? We had in 5,592 barrels, with 6 hoops on each. I think it important that it should be known for the guidance of masters inexperienced in the trade that the above are facts. Many ships have been lost, I believe, on this account.

JOSEPH HAND,

Master of American bark "Sunbeam," of Philadelphia. Antwerp, Belgium.

#### American Passenger Locomotive at Paris.

Among the curiosities to be exhibited at the forthcoming International Exhibition at Paris, says the *London Mining Journal*, is a really marvelous little model of an American passenger locomotive, which runs under steam upon an endless railway of only 6 inch gauge. It was entirely constructed by an American artisan formerly connected with the Delaware, Lackawanna, and Western Railroad Company—Mr. W. R. Lendrum—and is valued at £400. The total length of the engine is 5 feet, and it is a complete representative of the large engine in every respect, the driving wheels being only 7 inches diameter. The pressure of steam used is 22 lbs., and the cylinders, which have a  $2\frac{1}{2}$  inch stroke, are but  $1\frac{1}{4}$  inch in diameter; the boiler is but 24 inches in length from the smoke stack to the fire pot, and only 5 inches in diameter. Its embellishments are profuse, and include, besides the usual appurtenances, a bell, whistle, sand box, and cab. The model will certainly attract much attention at Paris.

#### Death of the Leper Governor.

From late Honolulu papers we learn the death of William P. Ragsdale, which occurred in December. Ragsdale, somewhat noted as the Governor of the Leper Settlement on the island of Moloka, Sandwich Islands, was a Hawaiian by birth, the son of a native woman by an American father. He was a lawyer by profession and spoke English and Hawaiian with equal fluency, and was the most noted orator of the whole kingdom. The way in which he discovered that he had the leprosy (*elephantiasis*) was accidental. Sitting in his office at Hilo (the capital of Hawaii) one night, in deep study over a law case in which he was greatly interested, the chimney from his lamp fell on the table. Forgetful of the fact that it was intensely hot, he picked it up thoughtlessly, in his excitement, without feeling the least inconvenience. Shocked at this, he looked at his hand, and found that it showed no sign of being burned. Repeating the experiment several times with the same result, he was

convinced that he was a victim of the terrible disease, leprosy, so prevalent in tropical countries. His suspicions were confirmed by medical authority, and he lost no time in communicating the fact to the proper government officials. Although it was customary for the police to arrest those suspected of being lepers, Ragsdale on account of his exalted position was not molested. He, therefore, voluntarily delivered himself up as a victim of the fearful disease, and was sent to Moloka, and installed as governor of the Leper Settlement, an office that he held at the time of his death. By his judicious administration of affairs, the many reforms he instituted, and by his kind-heartedness he made himself extremely popular in this sad community of 800 afflicted people, and for these reasons the unfortunates loved him as a father.

#### The Oroheliograph.

Our French correspondent writes: "Thanks to the extreme kindness of M. le Commandant de la Noë, I am enabled to give his communication to the last meeting of the Photographic Society of France in full."

It is as follows: I have the honor to present a photographic apparatus intended to produce upon one plate and by a single exposure the panorama comprising a nearly complete circle as seen from the position or station necessary from which it is obtained. The only interruption in the image obtained of the whole horizon is that which corresponds to the support of the mirror, which forms the special feature of this instrument; it thus results that if two views be taken, observing that the support occupies a different place in each, a panorama absolutely complete may be secured.

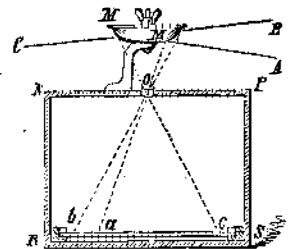
The instrument is composed of an ordinary camera inclined at an angle of  $90^\circ$ , as it was desired to photograph the sky; is surmounted by a parabolic mirror placed at a certain distance above the lens, the focus of which is equal to its axis. The purpose of this mirror is to reflect all the luminous rays emanating from the divers points of the horizon and to concentrate them upon the lens, which they traverse, forming upon the sensitive plate underneath the image of the corresponding points.

With this apparatus is obtained, in the form of a circle, a non-distorted image of the horizon. The horizontal lines become naturally curved, but the vertical lines are not deformed; and the angles obtained from the center of the circle to the different points of the image are exactly equal to those formed by the lines from the station carried out to the corresponding points of the horizon and all visible objects contained thereby. This property makes the apparatus most valuable for reconnaissances, for instance, in mountainous countries; and it can be imagined how by the aid of two or more panoramic views taken from determined places the operator can lay down upon a map the exact positions of different summits and calculate their altitude. In this manner may be obtained, with little labor and expense, the complete canvas or skeleton of a reconnaissance, which may have any of the details completed by ordinary means.

It is for this object, in fact, that the apparatus has been planned, and called by its author "oroheliograph." The problem was drawn up by M. Prudent, captain in the engineers, and realized by Lieut.-Colonel Mangin, of the same corps, who has calculated the form and size of the mirror and studied the various optical conditions which it was necessary to satisfy.

The model shown to the Society was rather primitive, and was organized to make the first essays. The mirror is not free from imperfections, and there is a sort of astigmatism in the images. The vertical lines are sharper than the horizontal lines. The reflecting surface is badly silvered, and has been injured by want of care in handling; in addition to this the silvering of the exterior is an inconvenience which, by another arrangement will disappear, and will permit of obtaining panoramic views without any interruption in their continuity. For all these reasons the print which has been obtained and exhibited does not possess all the perfection desirable, but it largely suffices to show that the final success is assured. The definite and revised apparatus is now in course of construction, and will most probably be made in such a way as to remedy an imperfection which I have not yet drawn your attention to. On the proof before the Society it will be seen that the landscape is in a sense reversed; that is to say, the objects which in nature follow from right to left are produced on the print from left to right. If it were only artistic results it were desirable to obtain, the film could be transferred upon a pellicle and printed from the reversed side, and the inconvenience would then disappear. But for topographical use this manner of proceeding would have bad results in consequence of the varied contractions of the pellicular image, which would render the angles incorrect; this will necessitate a modification, for which purpose there are several plans to choose from.

Such is the presentation I have had to make. You will, I am sure, excuse my having brought before you an apparatus in so primitive a shape; but I thought that the interest of the question would cover the form. I hope, however, to favor you soon by presenting the complete instrument, and in a state of perfection.—*British Journal of Photography*.



M M, mirror; b a c, sensitized plate; O, lens; N P R S, camera.

**New Agricultural Inventions.**

Mr. Wm. S. Dangler, of Ottawa, Ohio, has patented a Gate Hinge, which is applicable to farm gates that are allowed endwise movement as well as a swinging movement. The improvement consists in a reversible bracket of quadrant shape, which is rigidly secured to the gate post, in combination with a horizontally vibrating guide block bearing an anti-friction roller, on which the gate is suspended and movable.

Mr. Shreve Hartshorne, of Bordentown, N. J., has invented an improved Potato Digger having two sifter plows, concave to turn the soil inwardly, and set one in advance of the other, together with a large central double-concave sifter plow in the rear. The operation is as follows: The foremost shares are drawn through the earth at a sufficient depth to pass under the hills of potatoes; they loosen and partly elevate the earth, and the rear share raises it still further. As the earth passes over the share it drops between the sifting rods and is separated from the potatoes.

A Fertilizer Distributor, having a shaking shoe under the hopper, operated by a scalloped wheel attached to the land wheel, is the invention of Mr. Wm. M. Boon, of Perry, Ga. It is designed for distributing guano and other fine fertilizers, and may be adjusted to distribute faster or slower, as may be required. The machine is somewhat of wheelbarrow shape, and is operated by hand.

Mr. Isaac A. Benedict, of West Springfield, Pa., has invented an improved Cultivator Plow. On the lower end of the standard is attached the large middle plow, and the draft strain is sustained by braces from the plow beam to the standard. The rear ends of the braces are slotted and the pitch of the central plow is regulated by bolts. The two smaller side plows are so adjusted as to throw the soil inward or outward as desired, and are braced by clamps and rods, the latter being vertically adjusted on the standard.

A Portable Press for Hay, Cotton, Moss, and other material, which has the advantage of baling them at the place of collection, being therefore specially adapted for the wants of farmers, is the invention of Mr. Albert A. Gehrt, of Quincy, Ill. The press is on wheels, and is worked in a horizontal manner by a follower operated by a pitman, eccentric cam, and the tongue which forms the sweep lever. The specification sets forth a number of new details in the operating mechanism.

Mr. Wm. Kinney, of Bellevue, Ohio, has invented an improvement in Clevises, in which the bow has grooves in the inner side of its pin holes and a shoulder formed upon the outer side of its lower end, and in which the pin has a lug upon the side of its lower end and a latch pivoted to and a shoulder formed upon its head. The construction is such that the pin cannot come out accidentally.

Mr. Sam. T. Ferguson, of Minneapolis, Minn., has made some improvements in that form of Sulky Plow in which two independent crank arms are employed to sustain the framework upon the running wheels, which consist, first, in extending the arms of the cranks past each other in parallel position so as to form supports for the platform, one of the crank arms being correspondingly lengthened so as to bring the centers of the wheels into alignment; secondly, in the particular construction and arrangement of two tubular sections for forming the crank arms; thirdly, the pivotal arrangement of the plow and its supporting frame, whereby the plow may be turned upside down above the platform for transportation; fourthly, the combination with the lever for lifting the plow of an adjusting device located on said lever for regulating the depth of the plow.

Mr. Matthew Moore, of Whippany, N. J., has invented a Powder Duster for Destroying Insects, applicable also for applying fertilizers. It consists of a rod having a metal shank and standard at its lower end, arranged at such an angle that when the rod is supported in an inclined position by means of a strap passing around the shoulders, the standard is vertical, the devices being combined with a horizontally oscillating receptacle having a perforated bottom, an agitator within, and a lever and connecting rod for imparting motion to the receptacle.

An improved Clevis for attaching the plows of wheeled cultivators to the crank axle has been patented by Messrs. Benjamin F. Needham and Laban W. Needham, of New Castle, Ind. It consists in a pair of slotted clamp plates, arranged to be fastened about a fixed collar upon the axle to form a horizontal bearing, and combined with a pivot bolt for the plow beam arranged at right angles to the axle and carrying adjusting washers to regulate the height of the plow beam upon said pivot bolt, and thus control the depth of the plowing.

Messrs. Wm. V. Devault and Dick J. Devault, of Johnson City, Tenn., patent a Straw Cutter designed to secure a greater sliding motion for the edge of the knife in proportion to the elevation of its lever, and hence a cleaner cut with less expenditure of power. The improvement consists in the construction and arrangement of the hand lever, knife, and gauge bar, so relatively connected as to secure in combination an improved lever action; and in the peculiar arrangement of the mouth of the feed box, designed to increase its capacity and to cooperate with the knife to produce a better cut.

A Draft Equalizer, or three horse evener, has been invented by Mr. Adolph J. F. Ehrlich, of Kellogg, Minn., the object of which is to balance the side draft when three horses are attached to a reaper, plow, roller, etc. This is accomplished by a combination of cross bars and braces with a guide and double pulley, the draft being transmitted from the whiffle-

tree and double tree by chains which run through the pulleys.

Mr. Charles Daniel, of Virginia, Mo., has devised a Reversible Plow, having two plowshares, one left-handed and the other right-handed, attached at the ends of an arm on a shaft which is journaled to the frame. By means of a lever and locking pin either plow may be brought and kept in position for use, or both may be carried horizontally when it is desired to move the plow from one field to another.

**New and Simple Photo-Printing Process.**

Professor E. Stebbing states that at a recent meeting of the French Photographic Society, Paris, which he reports in a letter to the *Philadelphia Photographer*, the most interesting and instructive communication of the evening was upon a new photographic process by M. Gobert, of the Bank of France.

This gentleman gave a rapid history of the value of the lithographic stone, of the difficulties to obtain it, and its probable disappearance ere long from the market, if new quarries could not be found. Under these circumstances anything which could replace it would be a great boon to commerce; "that is why," said he, "I have been studying to replace it by plate glass, of which we have no fear of having a scarcity, and I have succeeded beyond my expectations; the only novelty being in the employment of ground glass. As to the photographic and lithographic manipulations, they are well known, and I have not changed them."

M. Gobert takes a ground glass, made rough either by an acid or by any mechanical means. On the finely ground surface he pours the following mixture: Albumen, 100 ozs.; bichromate of potash, 3 ozs.; the plate being held all the time by an India-rubber holder. When covered, the plate is turned upside down, and hooked upon a piece of string hanging from the ceiling by means of an iron eye screwed into the handle of the plate holder; the plate is now made to turn rapidly, in order that the centrifugal force may bring the solution on the surface as even and as thin as possible.

It is necessary to have the prepared surface as thin as possible. When dry, it is put into the screw press or printing frame, under the object to be reproduced; if placed in the sun an exposure of one or two seconds suffices; if in the shade, naturally more is required.

When exposed the plate is taken into the dark room, and without any preliminary operation it is inked over with ordinary printing ink; the ink sticks to every part and makes it look like a blackboard. The glass is then plunged into a tray containing water, when immediately the ink breaks up like, as it were, a sea of ice, from all the parts on which the light had no action, and leaves the image standing out in bold relief. All that is necessary now is to send it to an ordinary lithographer to have as many prints as may be required. From 200 to 1,000 may be printed off the same plate. Professor Stebbing is certain that this idea will be very fruitful, and adds that although only line engraving can as yet be obtained, who knows but what ere long the half tones may be produced with ease? As to sharpness and fineness of execution in the reproduction of some bank notes which were handed round at the meeting, nothing could be desired; they were admirable in finish and execution.

**Imitations of Tortoise-Shell and Mother-of-Pearl.**

The current number of the *Gewerbe Zeitung* says that imitations of lapis lazuli, tortoise-shell, and mother-of-pearl are imported from Paris and highly extolled, while the same process of manufacture was known and practiced in East Austria as long as twelve years ago by the now deceased chemist, Leo Fichtner, of the firm of Fichtner & Sons, at Atzgersdorf, near Vienna. Illustrating its remarks with two beautiful samples, one of the factitious tortoise-shell and the other of the mother-of-pearl, both of East Austrian production, it proceeds to tell how they are made.

The "shell" imitation, which is in the greatest demand, may be made on glass, and consists of a layer of clear gelatine on which the characteristic markings of the tortoise-shell are produced by dotting it with a concentrated solution of vesuvium (aniline color), to which a handsome reddish shade may be given with fuchsin; or the solution is spattered over the surface and the drops allowed to run together. When dry the whole is covered over with a coating of glue.

The imitation of mother-of-pearl is more difficult. It may likewise be made on glass, and contains in the first gelatine layer a concentrated solution of some salt. Several salts may be chosen for this purpose, such as white vitriol, epsom salts, etc. After the crystallization of this salt solution, and when dry, essence of pearls is spread over the whole. The latter material (which is also used in producing most deceptive imitations of pearls) is made from the exceedingly fine and silvery shining belly scales of the white fish, which are scraped off and washed out thoroughly.

To the gelatine layer thus prepared a coat of glue is applied and the article is finished.

**Harmless Colors.**

It is a well known fact (and the London *Lancet* has recently called attention to it again) that at the present time it is almost impossible to find among the painted toys for children a single one that does not contain, in the colors used for its decoration, substances that are either positively poisonous or else injurious to the health. It seems probable that this important matter is soon to be remedied by the substitution,

for the pigments now in use, of a series of perfectly harmless colors which the experiments of M. Turpin have succeeded in producing. At a recent meeting of the "Society for the Encouragement of National Industry," in Paris, M. Turpin exhibited a series of samples showing every shade of every color necessary to fill out the entire chromatic scale of Chevreul.

Among these colors the principal ones are derived from eosine or from fluoresceine. They furnish, with hydrated oxide of zinc, lakes of very rich shades, varying from pale rose to dark red (of a vermilion tint). The lakes derived from chromate of zinc and a potassic solution of eosine are remarkable for the brilliancy of their tints; which may vary from pale yellow to the brightest orange-red. Fluoresceine treated in the same manner yields lakes of a beautiful yellow, and by making use of a proper admixture of these two bodies there may be produced very brilliant lakes, which are incomparably more beautiful than the poisonous colors now in use, such as vermilion, red lead, orange mineral, and chrome yellow.

These new colors may be used either in oil, varnish, or water, and the majority of them can even be made into a paste with caoutchouc, since they resist the temperature at which the last is prepared.

**New Mechanical Inventions.**

A new Roller Skate, in which the curves may be rounded with facility by the centrally pivoted roller shafts and hangers of the sole and heel plate, is the invention of Mr. Silas A. Allen, of New York city. The improvement consists in having a combined sole and heel plate with solid triangular bottom pieces, which are recessed to form arc-shaped cheeks, along which the roller shafts, pivoted to the center of the reversed pieces, swing, to admit by the rocking of the sole and heel plate the converging of the roller shafts and the rounding of curves.

A Machine for Testing the Quality of Rolling Stock, etc., such as rails, wheels, axles, journals, brasses, springs, and other parts, is the invention of a Hungarian, Szent-Gyorgyi Elek, of Buda-Pesth, Austro-Hungary. The object is to provide a machine for testing at any place the materials, subjected to the same mechanical wear as when in use, and not under the fixed conditions of the ordinary testing apparatus. The machine is called by the inventor a "rotary railway-rail." It has endless rails placed on supporting disks of a revolving axle, upon which the wheels, with their axles, boxes, and other appurtenances, are weighted down as desired. In this manner the inventor claims a means of ascertaining whether materials are furnished according to contract, of deciding between different forms of construction, of testing lubricators, of observing the causes of heating of bearings, and of determining the manner of avoiding the latter.

Mr. Thomas Fetherstone, of Orange, N. J., has invented a Propelling Device for boats, in which a screw propeller is operated by a revolving double crank shaft, worked by the feet, which carries a large bevel wheel transmitting motion to the propeller shaft by an intermeshing bevel pinion at the end of the latter. By means of hand levers, extending forward, additional power may be added by persons in the boat. Mr. Fetherstone makes the propeller shaft flexibly jointed, to provide for the giving of the shaft to unequal strain, and to admit of adjusting the screw at varying depths under water.

Mr. William H. Sutton, of Purdy, Tenn., has invented an improved Nut Lock for the nuts of fish-plate bolts, to prevent them from working loose. It is formed of two strips of sheet metal slitted longitudinally and transversely, having the flaps thus formed bent outward at right angles to make flanges which rest against the sides of the nuts, having hook-tongues at the outer ends to hook upon the ends of the fish-plate, and having a tongue formed upon the inner end of one strip to hook into the inner end of the slot in the other strip.

An improvement in Half-Springs for vehicles has been patented by Mr. Lewis J. Bazzoni, of Newburg, N. Y. The object is to connect the side bars or body sills of wagons with the ends of the half-springs in such a way as to give motion lengthwise and sidewise, so as to prevent twisting and straining. The new feature is the employment of short plate springs, secured at the upper end in a socket of the side or cross bar, and pivoted at the lower end to a lug bolt in the half-spring.

An ingenious Platform Door for Stove Ovens, which is weighted at its lower end and provided with inclined pivots working in ears on the frame, so as to close automatically and remain closed without a latch, has recently been patented by Mr. Ebenezer Barrows, of Brooklyn, N. Y.

Mr. E. A. F. Toepperwein, of Boerne, Tex., has invented an adjustable Gun Hammer, carrying a swiveling striker, with locking devices, so arranged that the same hammer may be used with both barrels of a double gun; the striker being capable of such adjustment as to bring it within the range of either nipple, or into an intermediate position between the two, for the prevention of accidents. The hammer may be used also with a single gun, or with one having more than two barrels.

Messrs. A. J. McCollum and Thomas Seely, of Marion, Ind., have invented a Saw Mill Carriage Attachment, by which logs, after being quartered, can be cut up for barrel heads and staves the full length of the logs, the boards being then cut with butting-saws into pieces of the proper length.