laws, well disciplined armies, systematic civil polity, religion and ornamental art. Several thousand years elapsed before this beneficent industrial spirit, which had first taught the savage to fashion tools of stone and then elevated him to the bronze age, raised him to the age of iron by teaching him to smelt, forge, temper, and weld the most useful of all the metals. If the useful arts had done nothing for man but to teach him how to work stone, bronze, andiron, they would deserve the credit of laying the indispensable foundation of all our culture, and thus doing more for us than any other branch of human employment has done. But their service did not cease there. It has continued and still continues with increasing beneficence. If we divide culture into a dozen eras instead of three, the stone, bronze, and iron ages, we should have to designate nearly all of them from industrial events. The sailing vessel, the mold board which turns over the furrow of the plow, the water wheel, the magnetic needle, gunpowder, the paper mill, movable type, the spinning wheel, the telescope, the quadrant, the chronometer, the steam engine, the steam boat, the steam railroad, the steam blast in smelting furnaces, the puddling furnace, the rolling mill, the labor-saving machinery of a thousand kinds—these are triumphs of industry, and the main causes of the superiority of modern over ancient civilization. It is the workingman, not the soldier, the priest, the statesman, the philosopher, the scientist, the artist, or the author, who has given us not only the foundation, but also most of the superstructure, of our culture.—*Overland Monthly.*

TO NEW SUBSCRIBERS.

All subscriptions to the SCIENTIFIC AMERICAN will be commenced with the year, unless persons, at the time of remitting, request to the contrary. Nearly all subscribers preserve their numbers for binding; and in most cases where subscriptions are received during the first quarter of the year, if the back numbers are not sent, they aresubsequently ordered. To save both the subscribers and ourselves trouble, the back numbers from January 1 will be forwarded, unless we are advised to the contrary. This course will be pursued till April 1, after which date the paper will be sent from the time of receipt of remittance; but subscription. may commence at any time, at the request of the subscriber, The above regulation applies only to those who give no instructions, at the time of remitting, as to when they desire to commence.

Death of the $40,600 Cow.

The celebrated Eighth Duchess of Geneva, the short horned cow to which we have already referred as bringing the enormous price of $40,600 at the sale of Mr. Campbell, at New York Mills, recently died in giving birth to a calf. It will be remembered that the animal was purchased through a mistake by the agent of a noted English cattle breeder, and subsequently resold to Col. Lewis G. Morris, of Fordham, N. Y., for $30,600. The loss is not only a heavy one pecuniarily, but a severe disappointment to the latter gentleman, as it was his object to use the cow as a means of materially improving the breed of short horned cattle in the United States. Col. Morris has still a large fortune invested in choice stock.

NEW BOOKS AND PUBLICATIONS.

HEAT AS A SOURCE OF POWER, with Applications of General Principles to the Construction of Steam Generators. By William P. Trowbridge, Higgin Professor of Dynamic Engineering in the Sheffield Scientific School of Yale College. Price $3.50. New York: John Wiley & Son, 15 Astor Place.

Professor Trowbridge has succeeded in producing a work which, we think cannot but be of much benefit to every student of mechanical engineering. It is intended as an introduction to "The Study of the Steam and other Heat Engines," and, as its title indicates, is devoted to the careful discussion and thorough elucidation of the steam generator. The various types of the atter are fully considered, and their theoretical and practical construction explained. The initial chapters on heat, combustion and fuel, are admirable treatises on their respective topics, clearly written, and containing the the most approved formulæ and rules. There are numerous illustrations and a brief appendix, with tables, &c. The volume is eminently practical in its tendency, and will form a valuable hand book for the professional engineer.

THE CONSTANTS OF NATURE. Part I. Specific Gravities, Boiling and Melting Points, and Chemical Formulæ. Compiled by Frank Wigglesworth Clarke, S. B. Washington, D. C.: Smithsonian Institution.

A volume of tables, compiled with great labor and research, of the gravities of nearly all known elements and compounds. The work is thoroughly well done, and the book will be found useful in every laboratory.

BUILDING CONSTRUCTION: BRICK. BUILDING CONSTRUCTION: TIMBER. Each Two Volumes (Text and Plates). By Robert Scott Burn, C. E., Author of "The Handbook of the Mechanical Arts," etc. Each Volume, 75 cents.

INORGANIC CHEMISTRY, for Use in Science Classes and Higher and Middle Schools. By W. B. Kemshead, F.R.A.S., F.G.S., Lecturer at Dulwich College, London. 75 cents.

ELEMENTS OF ZOOLOGY, for Schools and Science Classes. By M. Harbison, Head Master of the Newtownards Model School. 75 cents.

These volumes form parts of the admirable "Elementary Series" issued by Messrs. G. P. Putnam's Sons, corner of Fourth avenue and 23d street Like the previous volumes published under this head, they are practical, lucid, and concise, and may be relied on as accurate treatises on their respective subjects.

Messrs. B. K. Bliss & Sons, of 23 Park Place, New York city, forward us the nineteenth edition of their illustrated spring catalogue of seeds, plants, etc., with supplement for 1874. The book contains a descriptive list of some 2,000 varieties of flower and vegetable seeds, a number of beautifully colored lithographs of flowers, etc., find an immense number of excellent engravings. There is beside a large amount of valuable information upon the subject of gardening generally, which will render the volume a useful guide both to the amateur and the professional gardener. The price is but 25 cents. The same firm also issue an abridged catalogue containing an almanac for the year and useful hints for every month. This is mailed on receipt of two three-cent stamps. The catalogue of potatoes for seed, which is forwarded free, has practical remarks on potato culture and full descriptions of many new and excellent varieties. The advertisement of the above enterprising firm will be found on the last page of this issue.

PATENT OFFICE DECISIONS.

United States Circuit Court—District of Massachusetts.

ADAMS ELECTRO-NICKEL PATENTS.—UNITED STATES NICKEL COMPANY *vs.* N. SHEPARD KEITH.

[In equity.—Before Shepley, Judge.—October Term, 1873, to wit, February 13, 1874.]

The defendant is charged with infringement of letters patent of the United States, granted to Isaac Adams, Jr., for "improvements in the electric deposition of nickel," dated August 3, 1869, and May 10, 1870, both of which patents have been duly assigned to the complainants.

Respondents deny the infringement, and allege that Adams was not the original and first inventor of what is claimed as his invention in either of the patents.

The history of the state of the art of electroplating with nickel, or what should with more propriety, in view of the progress then made in the art, be denominated the electro-deposition of nickel, prior to the discoveries of Dr. Adams, is sufficiently given, in the opinion of this court, in the case of United Nickel Company *vs.* Anthes. *Official Gazette*, vol. I., p. 578, not to require repetition here, otherwise than by reference to, and reiteration of, the views expressed in that case. Much additional evidence has been introduced in the record in this case upon the issue of novelty. Yet, after a careful review of the whole evidence, both in relation to what was alleged in that case as anticipating the discoveries and inventions of Dr. Adams, and is again alleged in this record, accompanied with further proof, as well as what additional and new matter is here introduced. I am confirmed in the conviction that the electro-deposition of nickel by means of the described solutions prepared and used, as described in his patents, and of such an anode as his patents describe, was unknown in any practical application of it to the useful art of electro-plating of metals, prior to the discoveries of the patentee. By electro-plating of metals as a useful art, I mean the uniform, continuous, and coherent deposit of one metal upon the surface of another, so as to produce a coating of the desired thickness, purity, uniformity, coherence, and permanency of adhesion, as distinguished from the mere electrolysis or electro-deposition of a metal out of a solution, whether such electro-deposition be or be not on the surface of another metal. And herein, in my view, consists the difference in the state of the art prior and subsequent to the discoveries of the patentee. Prior to his discoveries and inventions, electroplaters and electro-metallurgists well understood how desirable a result it would be to be able to plate the surface of base metals with a coating of nickel, resembling silver in luster and color, without its liability to tarnish on exposure to the air. Yet while it was thus well understood, as stated by Napier, that if the practical difficulties could be overcome, "the application of nickel to the coating of other metals would be extensive, and the property of not being able to tarnish would make it eminently useful for all general purposes; yet, with all the research and investigation which have been so lavishly bestowed on this case, the respondents have signally failed to show that electroplating of metals with nickel had any practical existence as accessible or beneficial to the public before the date of the inventions of Dr. Adams. Since that time, under the processes described in his patent, the art is so extensively practised, both in this country and Europe, that, as stated by one of the witnesses in this case, it would be less difficult to name articles used in the mechanic arts which have never been nickel-plated than those to which nickel-plating has been applied. The claims in the two patents are as follows: In the patent of August 3, 1869:

1. The electro-deposition of nickel by means of a solution of the double sulphate of nickel and ammonia, or a solution of the double chloride of nickel and ammonium, prepared and used in such a manner as to be free from the presence of potash, soda, alumina, lime or nitric acid, or from any acid or alkaline reaction.

2. The use for the anode of a depositing cell of nickel, combined with iron, to prevent the copper and arsenic which may be present from being deposited with the nickel or from injuring the solution.

3. The methods herein described for preparing the solution of the double sulphate of nickel and ammonium.

4. The electroplating of metals with a coating of compact, coherent, tenacious, flexible nickel, of sufficient thickness to protect the metal upon which the deposit is made from the action of corrosive agents with which the article may be brought in contact.

Also, but which is not involved in this suit—

5. The deposition of electroplates of nickel, to be removed from the surface on which the deposit is made, and used separately therefrom.

In the patent of May 10, 1870, the claims are as follows:

1. The combination with nickel to be used for anodes, of a metal or metalloid, electro-negative to the nickel in the solution displayed.

2. A nickel anode, combined with carbon and cast in the required form.

As the respondent has infringed the patent of May 10, 1870, by the use of anodes in the electro-deposition of nickel, substantially like those described and claimed in that patent, and has also infringed the first claim of the patent of August 3, 1869, by the use, in the electro-deposition of nickel, of a solution of the double sulphate of nickel and ammonia, prepared and used in such a manner as to be free from the presence of potash, soda, alumina, lime, or nitric acid, or from any acid or alkaline reaction, it is not necessary to decide the questions presented on the constructions of the fourth claim of the patent of August 3, 1869.

In deciding that the evidence in the record proves an infringement of that patent by the use of the solution therein described, I do not overlook the fact that respondent's solution contained one one-thousandth part of tartrate of ammonia, and one eight-hundredth part of ammonia.

The evidence in the case satisfies me that in the defendant's solution the first was an inert substance, and the second would be, and was, speedily eliminated from the solution in use by evaporation.

Decree for injunction and account as prayed for in the bill.

DECISIONS OF THE COURTS.

United States Circuit Court—Southern District of New York.

PATENT PAPER BAG MACHINE.—THE UNION PAPER BAG MACHINE COMPANY *et al. vs.* G. L. NEWELL AND G. H. MALLARY.

[In equity.—Before Blatchford, Judge.—Decided November 26, 1873.]

This is an application for a preliminary injunction, to restrain the defendants from infringing letters patent granted September 12, 1865, to Benjamin S. Binney, assignee of E. W. Goodale, the inventor, for a "machine for making paper bags." As the claim of infringement on this application is confined to the first claim of the patent, only such parts of the specification need be referred to as relate to that claim. The specification says:

"This invention consists, first, in giving to the side cutters an irregular curve at or near their inside ends, in such a manner that the form of the paper cut by their action, and the corners produced by folding said paper, are of such a shape that the paste shall come upon the paper where it is single, and thus be enabled to hold better than it does when it is applied in the ordinary way.

It designates as "side cutters" the cutters "which serve to cut the paper so that the sides may fold and make the seam in the center of the bag." It says that

These cutters or knives are bent in an irregular curve near their inner ends, so that the paper cut by their action, and the corners produced by folding said paper, are such that the paste shall come upon the paper where it is single, and that it will hold better than it does when applied to the paper in the usual manner.

One of the figures in the drawings contains lines which are said, by the specification, to designate the cuts made by the side cutters. The first claim is in these words:

Making the side cutters, B, with curved ends, substantially as and for the purpose set forth.

In the defendants' machine there are cutters which serve to cut the paper so that the sides may fold and make the seam in the center of the bag. They are side cutters. They make a cut of a definite length from the outside edge of the paper inward toward the center, so as to leave flaps or side pieces, which are then to be folded over from each side toward the center, overlapping each other at the center, and making a seam in the center. The defendants' side cutters are not straight or unbent in their whole length, nor are they bent at an angle near their inner ends; but they are bent in a curve near their inner ends. The effect of this curve is that, when the side pieces are folded over, the central end piece, of a single thickness of paper, may be pasted down without folding over, in addition to such single thickness, any part of the double thickness formed by folding the sides, and yet the corners will be perfectly close and tight. This result is due to the curve near the inner ends of the side cutters in contradistinction to an angle there. Where the cutter shave an angle there, and the central end piece, of a single thickness, is pasted down without folding over. In addition, any part of the double thickness, there are holes or openings at the corners, and, to make tight corners, it is necessary to fold down part of the double thickness, and then the paste can only come upon the inner one of the two thicknesses, while the outer one, not being held to the inner one, tends to draw the inner one away from the surface to which it is pasted. This is precisely what is done by the patentee's arrangement, and what he describes in the specification as the result of his arrangement, when he says that the form of the paper cut by the curved side cutters and the corners produced by folding said paper, are of such a shape that the paste shall come upon the paper where it is single, and thus hold better than when applied to the paper in the usual way. The language of the specification is not very artistic, and the idea sought to be conveyed is not as well expressed as it might be; but the meaning cannot be mistaken, when read in view of the state of the art by a person skilled therein.

It is to be noted that the body of the specification speaks of the curve near the inner ends of the side cutters as being an irregular curve, and that the claim drops the word "irregular," and claims making the side cutters "with curved ends, substantially as and for the purpose set forth." It is contended by the defendants that the drawing of the patent shows the cut made by the side cutters as being, for its whole length, of a form of curve which may properly be called irregular, as a whole, and that the defendants' side cutter is straight for most of its length, and of a regular curve near its inner end. But this is immaterial. It is not shown that any side cutter with a curved inner end, for the same purpose, existed before. That being so, any degree of curve to the inner end of the cutter, which will produce the result described, is within the claim, and must be regarded as an irregular curve, whatever the word "irregular" may mean. Nothing but a curve will produce this effect. An angle will not. The patentee was the first to use the curve. The form of curve represented in his drawings will produce the effect. His claim speaks merely of "curved" ends. Hence any curved end which will produce the result is his curved end.

It is contended for the defendants that, as the patent sued on was issued under the authority of the act of July 4, 1836, (5 United States Stat. at Large, 117,) and as that act is repealed by the 111th section of the act of July 8, 1870, (16 id, 216,) such repeal vacated and made void the said patent; and that, if this is not so, yet no suit can be maintained upon said patent for any cause of action which accrued after the 8th of July, 1870, as did the cause of action in this suit. The 111th section of the act of 1870, which repeals the act of 1836, contains the proviso that "the repeal hereby enacted shall not affect, impair or take away any right existing under the repealed act, "but all actions and causes of action, both in law and in equity which have arisen under" said act, "may be commenced and prosecuted, and, if already commenced, may be prosecuted to final judgment and execution in the same manner as though this act had not been passed, excepting that the remedial provisions of this act shall be applicable to all suits and proceedings hereafter commenced."

The rights created by, and arising under, a patent granted under the act of 1836, are rights existing under that act. The proviso declares that the repeal of that act shall not affect, impair, or take away such rights. A right granted by the patent in suit is the exclusive right to make and use and vend to others to be used, the inventions claimed in the patent. Such right was a right existing under the act of 1836 on the 8th of July, 1870. The right to sue after the latter date for infringements of the patent committed after that date, may in one sense, be said not to have been a right existing on the 8th of July, 1870, because the cause of action had not then arisen. But the grant held under the patent was a right, and a vested right. Such grant, it was intended, should continue till it should expire by its limitation. This is apparent from the provisions of the 63d and 64th, 65th and 66th sections of the act of 1870, which enact that patents granted prior to March 2, 1861, (and which were patents for fourteen years) may be extended for seven years beyond the original terms of their limitation.

It is further urged that the wording of the proviso to the 111th section of the act of 1870 is such that the only right saved is the right to prosecute actions and causes of action which arose prior to July 8, 1870, on patents theretofore granted. No reason is assigned why, if such prosecutions are allowed, they should not also be allowed in respect of causes of action arising on or after July 8, 1870, on such patents. But the point taken is rested solely on the fact that the enactment in reference to prosecutions is introduced by the word "but;" and it is maintained that the effect of the use of that word is that the rights declared in the preceding part of the proviso to be not affected, are limited to the actions and causes of action afterward specified, that is, to such as arose before July 8, 1870. No such effect, however, can properly be given to the use of the word "but." The first part of the proviso, as already stated, has the effect to keep in life the patent and its grant. But actions has been brought and were pending on existing patents, which had not been sued on, and the provisions of all prior existing acts in regard to suits on patents were being repealed. Hence, the necessity of providing that such actions and causes of action might be prosecuted in the same manner as though the act of 1870 had not been passed. But the proviso goes on to declare that the remedial provisions of the act of 1870 shall apply to all suits thereafter commenced for causes of action existing on the 8th of July, 1870, under patents previously granted. It leaves existing suits to be conducted according to the remedial provisions prescribed by the prior acts. There remain, however, suits to be brought on causes of action arising on or after July 8, 1870, on patents theretofore granted. The proviso does not apply to the manner of conducting such suits. The existing patents and the grants of right in them, being saved by the proviso, a reference to prior sections of the act shows that those sections apply to then existing patents, and to suits to be brought thereon, for causes of action to arise on or after July 8, 1870, as well as to patents to be issued under the act of 1870, and to suits to be brought thereon. Thus the 53d section, in regard to reissues, embraces reissues of existing patents. If not, as all prior acts are repealed, there could be no reissues of such patents. The same is true of the 54th section, in regard to disclaimers, and of sections 55, 56, 58, 59, 60, 61, and 62, in regard to suits. Full authority is given by the latter sections for bringing this suit.

As to the alleged licenses set up by the defendants, it was fully considered and passed upon in a former suit in this court, between the parties to this suit, where it was held, on final hearing, that such license had no valid existence, as a license, in the hands of the defendants, as against the Union Paper Bag Machine Company, and persons holding under them.

Nothing is shown to affect the novelty of the first claim of the patent sued on, the infringement is clear, and the case, on all points, is one entirely free from doubt.

The injunction asked for must, therefore, be granted.

George Harding and Fisher & Duncan, for plaintiffs.

Marcus P. Norton, for defendants.

Recent American and Foreign Patents.

Improved Locomotive Driving Wheel.

Joseph C. Wilson, Oshkosh, Wis., assignor to himself and Mahlon P. Barry, same place.—This invention consists in a driving wheel formed of an inner and an outer wheel, of which the former sustains the weight of the locomotive on its hollow shaft, and revolves along the inside of the tyre of the outer wheel, the solid shaft of which passes through the hollow outer shaft. The addition of the hollow shaft, it is claimed, adds greatly to the strength of the locomotive axle, and the working of the inner wheel in the outer increases the driving power considerably by economizing in the wear and tear of the tyre, and otherwise.

Improved Apparatus for Converting Motion.

Romulus R. Stevens, Stockton, Cal., assignor to himself and Lewis M. Cutting, same place.—This invention consists of a reciprocating toothed bar above the axis of the shaft to be driven, and another below it, in different planes, connected together by yokes. With these are combined a toothed wheel on the shaft, and apparatus for shifting the bars at each end of the stroke to change them, so that one turns the wheel going one way, and the other when going the other way, thus giving continuous motion to the wheel. The invention also consists of a cam and spring, so combined with the shaft as to expend some of the excess of the power of the piston at mid-stroke on the spring, and return it to the shaft during the latter portion of the stroke, when the effect of the steam is diminished, to equalize the application of power. By this arrangement, it is believed, power may be largely economized, because the application of it is always at the rims of the toothed wheels; also because the balance wheel is dispensed with, and the engine enabled to run slower, as compared with the speed of the driving shaft.

Improved Pump.

Thomas Wilmington, Ossian, Ind.—This is a double acting lifting pump, having two cylinders made in a block of wood, with a metallic water chamber above the cylinders, or resting on the block. A plate on top of the chamber has a valve orifice, which is closed by a valve. Above the valve is another metallic chamber, which is covered by a plate, to which the delivery pipe is attached. The lower valves are seated on the plate beneath the block, to which plate the induction pipes are attached. The bucket rods pass through stuffing boxes, and extend up to the top of the stand, where they take hold of the ends of two vibrating bars. The bars work on a pivot rod, which passes horizontally through the top of the stand, and their ends extend back from the pivots, and enter loosely the ends of the cross of the working lever. The working lever is vibrated on the pivot in the top of the stand, and motion is imparted to the pistons thereby.

Improved Boot Pac.

James A. Weaver and William B. Hawkins, East Saginaw, Mich.—The sole leather boot pacs worn by lumbermen and other woodmen, and known as "tongue pac," have heretofore been made with seams at the quarters; also with seams from the top of the upper, a little each side of the instep, along the sides of the top of the foot, to the top of the toe, thus making the upper of three pieces, which require several seams for sewing them together. It is now proposed to make the whole upper in one piece, which is joined together at the heel by one short seam only. The latter is thus located where it is so re-enforced and stiffened by the counter that it is not so liable to open and leak when the leather is water-soaked. The leg is sewn to the upper, so that its seam does not join the upper at the seam of the heel of the latter, so that the tendency to open at the junction is lessened.

Improved Truck.

Andrew V. Smith, San Francisco, Cal.—This invention relates to that class of hand trucks wherein a ratchet and pawl mechanism is employed to retain the truck in a stationary position while loading, as in the patent, No. 114,219, granted to same inventor. In using the attachment, when the trucks have been run up to the side of the packages to be moved, and are stood up in the ordinary manner, the operator puts his foot upon the middle part of a chain and presses it, throwing the engaging ends of pawls into gear with teeth, locking the wheels so that the trucks cannot move backas the packages are placed upon them. When the trucks are loaded, a slight forward movement will throw the pawls out of gear, the incline of the teeth forcing the engaging ends of the said pawls back sufficiently to carry the line of draft of the springs past the pivots of the pawl.

Improved Window Sash.

Hiram C. Burk, New Cumberland, O.—The object of this invention is to improve the window sashes in such a manner that they slide easily in the frame without rubbing off the paint, and that they may be quickly and readily detached for repairs, and conveniently fastened. The window frame is provided with grooves lined with sheet metal. The sash has projecting side rails, of which one slides loosely in a groove of the sash, while the other is firmly connected thereto. The sides of sash facing the window frame are rounded off to produce as little friction as possible, and prevent the rubbing off of the paint from the adjoining parts of the frame. The groove leaves a solid part at the lower corner, on which the loose rail is supported, so that it cannot dropout on hoisting the sash. A hook-shaped projection at the upper end of the loose rail serves to lift it out of the groove, so that the sash may easily he taken out of the window frame, as the rounded-off side offers no obstruction to its detachment. The fixed rail is provided with notches, into which snaps a projecting catch of a band spring, which is suitably applied into a recess of the frame, retaining the sash at any desired position.

Improved Blacking Box.

Charles W. Beebee, Ravenswood, N. Y.—This invention has reference to that class of blacking boxes which are constructed of wood and provided with a handleand cover. It consists in forming the recess orcavity for the reception of the blacking by means of augers or boring tools, so as to lessen the cost of manufacturing said boxes, and, at the same time, to form scalloped inner sides or projections, which are designed te form a surface for rubbing the brush, in order to spread the blacking evenly on the same.

Improved Wheel Plow.

Solomon Neff, Cuba, Ill.—The wheels revolve on short axles, through the inner ends of which are vertical slots that receive the arms of a frame, on which is supported a plow frame. To the frame is attached a horizontal extension, to which a plow frame is loosely pivoted, so as to have free lateral play. The plow frame is thus held securely in a horizontal position at any desired depth, the vertical arms of the frame being adjustable in slots of the short axles, and held by wedges at any hight. The tongue is loosely pivoted on the cross bolt, so as to move freely in a lateral direction, while it also turns on a vertical pivot bolt in a horizontal clevis, adjustable in different holes, according to the furrow width which is intended to be cut. Thus the tongue not only determines by its position the width of furrow slice, but also preserves its freedom of lateral motion.

Improved Apparatus for Making Gas.

Joseph D. Patton, Trevorton, Pa.—The object of this invention is to provide a means for the manufacture of illuminating gas from petroleum in any liquid form. in a single retort, without subjecting it from the first to the intense heat necessary to convert it into fixedgas, and to provide for the purification and storage of the gas in a simple and efficient way. The invention consists, first, of retorts of any form placed in a furnace to secure temperatures varying from bright red heat at one end to very dull red heat at the other end of the same retort, with connections arranged to admit the oil at the coolest part, and cause it to passa long to the hottest part and out thereat when converted into gas. Second, the invention consists of a condenser located in the gas holder, divided longitudinally into compartments communicating with each other at top and bottom, the inlet pipe from the retort communicating with one compartment near the bottom, an escape pipe connecting with the bottom of the other, an exhaust pipe for taking out the deposit, and both compartments being surrounded with water. Third, a small boiler communicating with the water tank surrounding the condenser by two pipes, one lower than the other, the boiler being below the water level, and having means for heating the water to prevent the water of the condenser from freezing in cold weather.

Improved Bench Plane.

Henry A. Gatley, South Boston, Mass.—This invention is an attachment for jack and other hand planes, which will enable the plane irons to be easily, accurately, and quickly attached, detached, and adjusted without hammering, and without any danger of springing the plane and making it untrue. A plate is let into the stock at the upper part of the inclined seat for the plane irons. To lugson the lowerside of the plate is swiveled a hand screw, the hand piece of which can be conveniently operated. Upon the screw is placed a nut, a toe of which enters a hole in the plane irons, so that the said plane irons may be adjusted by turning the screw. Through suitable mechanism, by turning a hand screw forward, a plate acts as a lever to lock the plane irons securely in place.

Improved Photographic Background.

Preston C. Nason, Columbus, O.—This invention is an improved background carriage for photographer's use, enabling the operator to adjust it whilestanding sufficiently far in its front to see when it is brought into position to give the desired effect in the relief of light and shade. The frame of the carriage consists of two side bars, inclining toward each other, and connected at their upper. lower, and middle parts by three cross bars. A metallic rod, rigidly attached to the centers of the cross bars carries a socket which may be turned and moved up and down upon the said rod. The socket is secured in place by a set screw resting against the rod. Upon the side of the socket, and at right angles therewith, is formed a second socket, to receive the spindle of the background, which is secured in place by a set screw.

Improved Wheel for Vehicles.

Joseph H. Glover, Freedom, Ky.—This invention relates to the construction and arrangement of devices for adapting a wheel for application of a cold tyre and securing the same to the felly. A tube receives the axle, and has boxes to receive the wear inserted in its ends. The hub is made in two parts; one is permanently attached to the tube, and the other slides upon said tube, both being made exactly alike. The outer surface of the parts is inclined in line with the curvature of the spokes, so that the wheel will pass any obstruction that will allow the rim of the wheel to pass. The parts are connected by right and left screws, which screw through the inner plates of said parts, and enter holes in their center blocks. Upon the centers of the screwsare formed heads for convenience in turning them to move the parts toward or from each other, and thus lengthen or shorten the spokes. The spokes are made forked in their inner parts, and solid in their outer parts.

Improved Ice Cream Freezer.

Charles Gooch, Cincinnati, O.—The top board, which is for the purpose of keeping the shaft of the dasher perpendicular, and also to hold a pin to prevent the can from turning when it is desired it should remain stationary, has two grooves on the under side, which fit upon the top edges of the tub. The distance between the grooves is less than the diameter of the tub at the top; hence it always requires to be sprung on by compressing the tub slightly; and by reason of the grooves being cut under on one or both sides, the bar and tub are firmly connected, so that the formermay be used as a handle for lifting or carrying about the other. This mode of connection dispenses with catches or other supplementary metallic fastening devices. A shortshaft is detachable from the cover of the can, and made square or polygonal at its ends, to adapt it for application of a crank and application to the said cover. It is used when the cream has been partially frozen or solidified, and the stirrer removed in consequence. The rotation of the can is then continued by the short shaft, and the freezing process completed.

Improved Passenger Register and Recorder.

José Medina and Manual Medina, Cordova, Spain.—The passenger register consists of a bell crank lever, which is set in motion by the passenger on entering the vehicle, and acts on a spring below. The latter communicates through suitable mechanism with a graduated indicator dial. The time register is constructed of a regular clock train, which carries, instead of index hands, a rotary dial marked with hours and minutes, and has above it a spring so arranged with a pencil or other marker that, when said spring is depressed by the weight of the passenger on the seat, the pencil will bear on the dial and mark, by the gradations thereon, the exact time during which the seat was occupied. The pencil also marks the time when the passenger rises.

Improved Joiners' Floor Clamp.

William W. Ingrum. Batesville, Ark.—The parts are put together with a pivot, on which they open and close, the same as a pair of tongs. A double ratchet bar, passing through mortises in the shanks, keeps the jaws closed when theyare attached to the timber of the floor or ceiling. The ratchet is made double, so that the clamp may be used overhead, and drops by its own gravity and engages automatically. Screw points through the ends of the jaw are turned by means of a small pin, and the points enter the sides of the timber and prevent the jaws from slipping. A metallic bar, which is loosely pivoted to one jaw, is attached to a piece of wood, which is placed against the flooring or ceiling which is to be forced up to its place. This bar is rounded on its inner side, and will roll or rock on the jaw and maintain a position parallel with the floor. A drag bar is pivoted to one of the shanks. The lower end drags on the timber, and it acts as a pawl to hold the clamp in position. The clamp, as a whole, is a lever, the purchase of which is the distance between the fulcrums and the center of the metallic bar. This machine is applicable to many purposes, but is more particularly designed to facilitate the laying of floors, ceiling overhead, or on walls and in similar places.

Improved Wagon Springs.

John Carpenter, Mariner's Harbor, N. Y.—An elliptic is formed of four pieces of wood connected by hinges at the ends. Rubber springs are confined in recesses made in the pieces and in theaxle and bolster. The pieces act as levers when the spring is in use. Plates of rubber are placed between the axle and bolster and the inner ends of the lever. This, it will be seen, is a double spring, and is designed for a vehicle.

Improved Whiffletree.

Lewis H. Webb, South Quay, Va.—A crotch is made in theend of the strut against which the truss rod bears, and a ring is fitted in the angle formed by the trees and the branches of the strut, for attaching to the clevis, said ring being to sustain the wear of the clevis, and being arranged so that it can be shifted around in its place at any time to turn the worn place away from the clevis, and present another unworn place. The ring has a groove in its periphery, in which the truss rod and the branches of the strut bear to hold it in place. The ends of the truss rod pass through the caps at the ends of the whiffletree to receive the couplings and to hold said caps securely against becoming detached. For connecting the traces to the couplings, a ring of two parts is employed, so contrived that, when separately hooked into the coupling and then placed together, they form a complete ring in which another ring in the trace can be engaged by separating the parts a little without removing them from the coupling, and hooking the trace ring first in one and then in the other. It is equally as well adapted for the connection of a toggle pin or any ordinary hook as a solid ring, thus allowing harness with any of the ordinary hitching attachments to be used.

Improved Furniture Spring.

William. T. Doremus, New York city.—This invention is an improved spring for chairs, and other articles requiring a rocking motion. Two plates, made with a bow in their middle parts, are attached to the seat and pedestal of a chair. There are three blocks made of elastic material. One is interposed between the bows of the plates, the second and third are placed within the separate bows of each plate. By adjusting the nuts of bolts which pass through them, the tension or strength of the springs may be regulated at will; and by tightening some of said nuts more than others, the spring may be adjusted to have more or less elasticity in either direction.

Improved Bracelet Fastening.

Henry Stone, Newark, N. J., assignor to Mulford, Hale & Cottle, New York city.—This invention has for its object to improve the construction of the bracelet catch so as to make it more safe and reliable in use. The invention consists in the combination of a spring catch with the hinged cap that shuts down over the ordinary spring catch of a bracelet.

Device for Promoting Combustion and Furnace for Steam Boilers.

Daniel T. Casement, Painesville, O.—The first invention relates to the use of balls, blocks, or other pieces of metal in a layer above the bed of fuel for the gases to pass through as they rise from the fire and impinge upon the surfaces of the blocks, whereby they are more thoroughly mixed with the oxygen, and also more effectually consumed; and the invention consists of devices, instead of a grate, for suspending said balls or blocks. The second invention consists of a tube at the center of the fire space, extending from the water space at the bottom up through the fire and above the crown sheet, with stuffing joints, and having the grate for supporting the balls or other pieces of metal attached to it. The grate is composed of tubes which receive the water for protecting them from said vertical tube, and deliver it at the outer part to a coil which secures the balls against bearing on the side walls of the furnace, and also circulates between the balls to keep them from fusing, and for generating steam. It finally discharges into the central supporting tube. The invention also consists in hollow dampers arranged in the smoke stack for utilizing the waste heat. Further particulars regarding these inventions will be found in the illustration and description published on page 135 of our current volume.

Improved Washing Machine.

John Darlington, Mazomanie, Wis.—Uprights connected at the upper and lower ends by longitudinal pieces carry rolls, the top one of which is fluted. To cause the clothes to move evenly and suffer a uniform compression, spring pressed guards, one on each side of the machine, are used, which press lightly against the outer rolls. By suitable construction one pair of springs keep all the rolls in their true relative position.

Improved Frame for Hot Air Registers.

Edward A. Tuttle, New York city.—This invention consists of an improved method of connecting the interior open work portion of the front or "border" of a hot air register with the outer or marginal portion in a way to simplify the means for fastening it, and facilitate the removal of it whenever it may be desirable to clean out the flue. The invention consists of the openings at the upper ends of flanges, and the arrangement of the upper edge of the open work part, so that when it is placed against the flanges it can be raised behind a lug, and the top wall raised enough for the lower edge to rise over another lug and drop behind it on a lower flange, and thus be held in place by the flanges and the lugs.

Improved Carriage Door.

George Kellner, Paris, France, assignor to Wood Brothers Company, of New York city.—The object of this invention is to provided an improved folding door for that class of carriages which are alternately thrown open and closed, so that, for instance, the changing of a landau or landaulet into a bertin or brougham, and *vice versa*, may be obtained. The invention consists in constructing the door of two sections, the upper half of which is hinged to the lower half, swinging to the inside of the same, both parts being provided with guides for the window. The upper part locks, when thrown open, by means of spring catch at one or both sides, into socket plates of the lower part, and produces thereby a rigid connection of both halves, forming a complete door for closed or open use of the carriage.

Improved Saw Filing Machine.

Walter W. Parsons, Stanstead, Canada.—On the inner end of the shaft of the driving wheel is a short crank which works a pawl to push the filer stock sliding frame along the saw. Under this shaft is another shaft which is geared with it by wheels, so as to turn at the same speed, and it carries a cam which lifts a rocking plate once to each revolution, to hold the file up while the frame is shifted by the pawl. These shafts are so geared that the cam lifts the rocking plate just before the pawl shifts the the frame along.

Machine for Removing Snow and Ice from Roadways.

Charles G. Waterbury, New York city.—A box wider than the space between the rails, and mounted on car wheels, has a furnace at each end. Both are inclosed at the sides and top, and surrounded by a water jacket for containing water for the protection of the walls of the furnace; also for generating steam for driving the fan, propelling the machine, or for use in combination with the fire heat for melting the snow and ice. From the fire grate bars in one furnace extends a plate or wall, inclosing an air box under the grates, into which the air blast is received from a fan, to supply the oxygen for the combustion of the fuel, and to blow the heat over a bridge and down upon the ground. In the other furnace the air blast is delivered on the top of the fire, and passes down between the grates, which are hollow tubes through which the water contained in the jacket circulates for their protection. Hydrocarbon fuel will be used in the furnaces constructed on this plan, either alone or in combination with coal or coke. The machine will be drawn by horses, and be moved fast or slow as needed for the depth of snow to accomplish the work. The heat will also be regulated by the quantity of air blown in by the fans, which may be regulated at will in any of the well known ways.

Tool for Squaring the Edges of Boot and Shoe Soles.

Joshua R. Reed, Baltimore, Md.—This invention relates to modes of evening, smoothing and rendering uniform the edge surfaces of boots and shoes, and consists in a tool peculiarly constructed and adapted to perform this work with great efficiency, and economy of human labor.

Improved Harvester Rake.

John E. Buxton and Thomas I. Howe, Owatonna, Minn.—This invention relates to that class of rakes used upon grain harvesters for the purpose of automatically raking the grain off the platform, transferring it to the rear end on a binding platform and distributing it in gavels of a size suitable to be tied and bound with facility. The invention consists chiefly in the employment, in connection with a rising platform, contracted in width towards its upper end, of a contractible rake which serves to convey the grain to the upper end of the platform on to a binder's table, in gavels ready to be bound.

Improved Baking Pan.

James D. Mason, Baltimore, Md.—This invention relates to attaching a shield or protecting plate to the bottom of the pans for the purpose of preventing the scorching of the dough, and thereby producing a better article of diet. The shield is made detachable so that the pan can be used alone when desired or necessary.

Improved Lubricator for Machinery.

Wm. S. Gillen, Leechburg, Pa.—This invention relates to means for lubricating machinery, by injecting, upon the parts subject to friction, drops of oil or other liquid at regular and short intervals. At every reciprocation of the cross bar on the guides, a stud will strike the end of a lever, unclose a valve, and allow a drop of oil to fall into that part of machinery subject to friction and designed to be lubricated.

Improved Hollow Hand Cutter for Leather, etc.

Abednego Dewes, Hudson City, N. J., assignor to himself and Marcus Hanan, New York city.—This improvement in hollow cutters, for cutting out shapes from leather, cloth, paper, etc., by hand, consists of detachable handles for said cutters, said handles being adapted for several different sizes, the object of which is to save the cost of so many handles. Each handle has four strong arms, branching horizontally from the lower end, to extend over and project beyond the top of the cutter in its long and short axes. A couple of short spring bars for fastening the handle to the cutter are slotted at one end, and meet together at a clamping bolt which passes through the slots, and screws into the center of the bottom of the handle.

Improved Bee Hive.

Hyram F. Bobo and Phillip F. Johnson, Trezevant, Tenn.—The bottom slides in and out upon cleats attached to the sides, and its forward part projects in front of the hive, to serve as a platform for the bees to alight upon, and as a handle for drawing out and pushing in said bottom. Upon the upper side of the forward part of the bottom, and in line with the doors when closed, is attached a narrow board through which is formed the opening for the bees to pass in and out. To the upper side of the rear end of the bottom is attached a board which projects upward nearly to the horizontal partition that separates the brood chamber from the honey box, and to which the comb frames are hinged, so that, when the said bottom is drawn out, the frames may be swung aside to allow the comb of any particular frame to be examined. The forward ends of the comb frames of the honey box are kept at the proper distance apart by a notched bar placed upon them.

Improved Saw Gumming Machine.

David Boyd, Vevay, Ind.—This invention consists in a maudrel, carrying a cutter and provided with a screw thread at one end, so as to adapt it to receive a rotary and progressive or longitudinal movement; also a corveel ball mounted on the cutter maudrel, and provided with a wedge which operates in concert with friction rollers for imparting a lateral movement to the cutter mandrel. The machine is designed for gumming large circular saws without removing them from their arbors. It will be found fully described and illustrated on page 150 of our current volume.

Improved Plow.

Harvey Blue, Medina, Wis.—To the forward part of the beam are attached two brackets, which carry a wheel which receives motion from contact with the ground. To the projecting ends of the journals of the wheel are attached cranks projecting in opposite directions, and to which are pivoted connecting rods. The rear end of one connecting rod is pivoted to a crank arm formed upon a hook which is pivoted to the side of the beam over the plow point. The hook passes down in front of the upper part of the colter of the plow and oscillates laterally to keep the colter free from rubbish. The other connecting rod communicates with mechanism, so that the forward movement of the plow may oscillate a bar longitudinally with the plow to keep it free from rubbish.

Improved Clothes Line Attachment.

Dwight W. Smith, Fox Lake, Wis.—This invention provides a convenient means for disposing of clothes for drying after being washed, and to avoid the tedious operation of hanging out the clothes in the ordinary way in the open air; and it consists in metallic supports or eyes attached to the clothes line, by means of which the line, with clothes attached, may be suspended from hooks in the wash room, and then detached and carried to the yard, and again suspended from hooks on the clothes line posts. The supporting eye is made of non-corrosive metal, having two tubes for the line. Through the lower one the line passes twice.

Improved Roofing Tile.

Garry Manvel, Rochester, N. Y.—This invention consists in a tile and cement roof, made of tile having the overlapping rib along one edge, a groove along the other edge, and the rabbet and notch in one end, arranged and connected together, the joints being cemented.

Device for Lubricating the Journals of Car Axles.

Philip Bauer, Manchester, England.—Upon the bottom of the oil receiver, and nearly in the same vertical plane with the axis of the axle journa above, are two perpendicular cylindrical sockets, which receive two spira springs. Above the upper ends of the guides is a horizontal plate, resting on the journal box, and slotted transversely in the center. Through the slot plays a flat faced disk or feed wheel. The upper parts of the circumference of the feed wheel press against the under side of the journal, and the lower dip into the oil or lubricant placed in the receiver, such lubricating material rising, by preference, no higher in the receptacle than the axial pivot of the aforesaid feed wheel. When the axle rotates, the journal, by its slight frictional contact with the feed wheel, communicates a corresponding movement thereto; whereupon oil from the oil receiver, adhering to the flat (transversely considered) face or periphery of the feed wheel as it passes through the receiver, is carried upward and over and in contact with the surface of the journal. The feed wheel is arranged to work through a central slot in a leaf spring, the ends of which are placed upon suitable fixed supports, with sufficient tension in the spring itself to keep the feed wheel continually pressed up against the journal. The agent for this invention is Mr. Charles G. Wold, 44 Exchange Place, New York city.