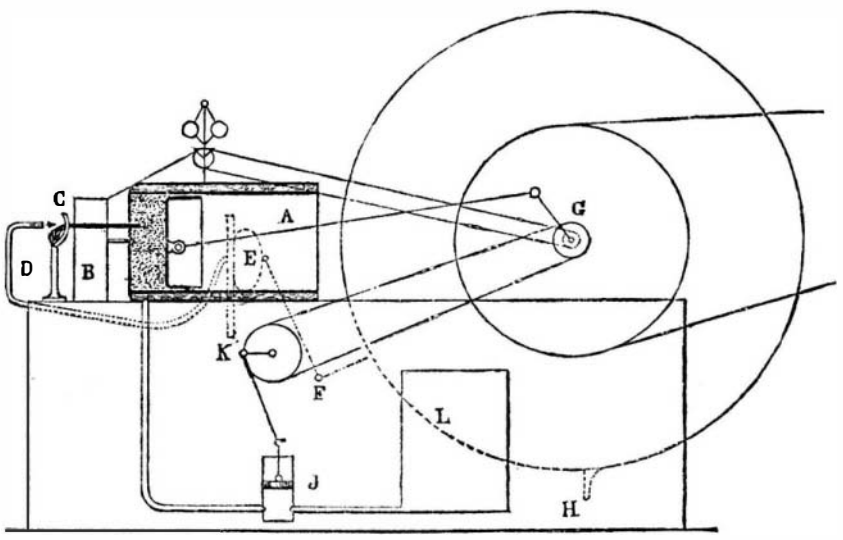
A PETROLEUM MOTOR.

An Austrian inventor has recently constructed the device represented in the annexed engraving, consisting of a petroleum engine, the principle of which is analogous to that of single acting steam engines, with the difference, however, that the expansive force of steam in the latter is replaced by the explosion of the finely divided oil. The *Revue Industrielle* says that the invention has been applied to sewing machines with considerable success. Although purporting to be an Austrian invention, we believe that it is nothing more than a poor copy of the petroleum engine invented by George B. Brayton of Boston, Mass., patented here in 1871-2 and now in successful operation in this country.

At the rear of the cylinder, A, are three valves. The valve in the center is covered with a finely perforated nozzle and allows of the entrance into the cylinder of the oil from a receiver, B. The valve opening on the left allows of the penetration of a flame, C, at the proper moment, said flame being driven through the orifice by air pressure as hereafter described. The effect of the flame meeting the oil in a finely divided state is an explosion, which shuts the two valves and at the same time drives the piston ahead. To the latter is hinged the connecting rod. The crank shaft, G, carries at one end a fly wheel and at the other a common pulley. The fly wheel has a cam, H, which at every revolution strikes against a lever, F, which communicates a pressure to an india rubber air bag, E. The current thus produced is led by tube, D, to the gas or petroleum flame, C, which is thus for an instant elongated and driven into the cylinder as above noted. The petroleum is introduced into the cylinder by atmospheric pressure, through a vacuum being formed in rear of the advancing piston. The return stroke of the latter is caused by the inertia of the fly wheel.



A PETROLEUM MOTOR.

The cylinder is jacketed, and is kept cool by the circulation of water through the intermediate space, forced by pump, J, from a reservoir, L. The governor, shown on the cylinder, connects in the ordinary way with the crank shaft; and by means of a combination of levers, governs the time of entrance of the petroleum. The smoke produced by the combustion of the latter escapes by the third valve before referred to, and into a chimney. The movement of the valve is governed by an eccentric on the crank shaft. The engine has been made of three horse power and is said to work quite cheaply.

The Use of Petroleum Benzin for Exhausting Oleoresinous Drugs.*

Many uses have been discovered for petroleum benzin since it became an article of commerce; and though but recently brought to notice, its applications, from thinning white lead to purifying rare alkaloids, from dissolving india rubber to removing grease from a silk dress, have secured for this product of Mother Earth a name and a place not to be despised.

The immense and overgrown development of the petroleum interest has tended to reduce the price of benzin to a very low figure; the common unpurified article is a drug in the market; and although efforts are constantly made to fit it for illuminating purposes, a means of rendering it free from liability to explode and to cause fearful accidents is yet to be discovered.

The purified benzin commands a much better price, is put to finer uses, and should alone be used for solvent purposes in pharmacy; the common article is unfit for any purposes in a preparation, for it will be sure, from its offensive odor, to leave its tracks in it.

The first requirement, in answering the query: What merit has petroleum benzin as a solvent for the extraction of oleoresinous drugs, like buchu, chenopodium, etc.?: was believed to be to secure a good benzin. This was readily done, and an article having the specific gravity of 0·642 was obtained, which on being tested proved to be free from objectionable impurities, and no odor was left on a clean sheet of paper when a small portion was poured on it, and suffered to evaporate.

Eight ounces of finely powdered buchu leaves were taken, and firmly packed in a Squibb's glass percolator, with the siphon arrangement. It was found to be best, however, to substitute the rubber lid for one made of wood, the wooden lid having a groove cut in the under surface to fit the rim of the percolator; and at the bottom of the groove, a rubber band made the joint airtight.

After allowing the powder to macerate for four days, the siphon was started, and the percolate, very dense and highly charged with extractive matter, came over, at first slowly, and afterwards rapidly; after two pints had passed, the buchu seemed to be exhausted, and so great had been the solvent power of the menstruum, so far as the chlorophyll and other coloring matters were concerned, that the residue looked as if it had been bleached.

The percolate was allowed to evaporate spontaneously, and the amount of oleoresinous extract obtained weighed 305 grains. This, at first sight, was supposed to contain all the active properties of the drug; and in order to test it, five grains were swallowed in a little water by the writer, producing, however, but little diuresis; the dose was increased to ten grains, which had but moderate effect.

Taking the dose of fluid extract of buchu at a fluid drachm, and granting that, one fluid ounce of the extract represents one ounce of the drug, it can be readily be seen, by a simple calculation, that, if the benzin had fully extracted the virtues of the buchu, five grains of the oleoresinous extract obtained would produce the same effect as a fluid drachm of the fluid extract, while ten grains would be a large dose.

This fact suggested that, although the buchu had every appearance of being thoroughly exhausted, it might yield some activity to alcohol, and it was then percolated with stronger alcohol, and a dense, dark colored liquid obtained, possessing a bitter taste and considerable odor.

Ten grains of this liquid produced active diuresis, and the writer has no hesitation in asserting that he believes alcohol to be much the better solvent for buchu.

Various other experiments with other drugs are now progressing, but sufficient progress has been made to justify the assertion that the uses of benzin in this direction are circumscribed; the principal objections to its use being inflammability and great volatility; it requires the use of apparatus not always at the command of all pharmacists; the odor is objectionable generally, and in many cases could not be tolerated by a weak stomach. A continuance of this subject was requested, in order to obtain further information with other plants.—*Joseph P. Remington.*

*Read before the American Pharmaceutical Association, September, 1873, and reprinted from the "Transactions."

Medical Value of Asparagus and Celery.

A medical correspondent of an English journal says that the advantages of asparagus are not sufficiently appreciated by those who suffer with rheumatism and gout. Slight cases of rheumatism are cured in a few days by feeding on this delicious esculent; and more chronic cases are much relieved, especially if the patient avoids all acids, whether in food or beverage. The Jerusalem artichoke has also a similar effect in relieving rheumatism. The heads may be eaten in the usual way; but tea made from the leaves of the stalk, and drank three or four times a day, is a certain remedy, though not equally agreeable.

So the English paper says. It may be well to remark that most plants which grow naturally near the sea coast contain more or less iodine, and in all rheumatic complaints iodine has long been a favorite remedy. One who was long in the drug business told the writer some years ago that many o the popular patent nostrums which some disinterested people—"for the good of their fellow creatures"—sold at two dollars a bottle, consisted simply of a few cents' worth of iodine in solution.

Iodine is dangerous, however, in overdoses, affecting especially the eyes. The same effect may be produced by eating abundantly of asparagus or celery, which are well known seaside plants. If these have no effect, the patent specifies will have none, and in that case a conscientious and intelligent physician is the best resort.

The Microscopic Examination of Well Water.

The author has sought an expeditious method of determining the quality of drinking water, and recommends the use of the microscope in detecting salts in solution by their crystalline form. For this purpose, a few drops of the water under examination are evaporated on a slip of glass either at a high or low temperature, and the forms of crystals obtained are compared with those of known salts, dissolved in water and recrystallized in the same manner. In this way one can detect with dispatch and certainty, common salt, calc spar, gypsum, etc., and to a certain extent the relative quantities present.

Sausages Colored by Aniline.

Aniline red is used to impart to sausages a fresh and healthy appearance. It can easily be detected by the use of alcohol or ether, either of which substances dissolves aniline, but not blood. The use of aniline red is severely reprehensible, not only from the fact that it is known to have caused the illness of entire families who have eaten meat colored with it, but also because, from its mode of preparation, it frequently contains arsenic, and must, therefore, act as a poison.

ICE is now selling in New York city at $20 a tun retail. This high price is alleged by the dealers to be necessary on account of the slim supply obtained last winter. The estimated cost of producing ice by machinery is $3 a tun. There is evidently a wide margin for profit and a good opportunity for inventors to bring out effective ice-making machines.

New Method of Coloring Metals.

Metals may be colored quickly and cheaply by forming on their surface a coating of a thin film of a sulphide. In five minutes brass articles may be coated with any color, varying from gold to copper red, then to carmine, dark red, and from light aniline blue to a blue white, like sulphide of lead, and at last a reddish white, according to the thickness of the coat, which depends on the length of time the metal remains in the solution used. The colors possess a very good luster; and if the articles to be colored have been previously thoroughly cleaned by means of acids and alkalies, they adhere so firmly that they may be operated upon by the polishing steel.

To prepare the solution, dissolve 1½ ounces of hyposulphite of soda in 1 pound of water, and add 1½ ounces of acetate of lead dissolved in ½ pound of water. When this clear solution is heated to from 190° to 210° Fah., it decomposes slowly and precipitates sulphide of lead in brown flakes. If metal be now present, a part of the sulphide of lead is deposited thereon, and, according to the thickness of the deposited sulphide of lead, the above colors are produced. To produce an even coloring, the articles must be evenly heated. Iron treated with this solution takes a steel blue color; zinc, a brown color; in the case of copper objects the first gold color does not appear; lead and zinc are entirely indifferent.

If, instead of the acetate of lead, an equal weight of sulphuric acid is added to the hyposulphite of soda, and the process carried on as before, the brass is covered with a very beautiful red, which is followed by a green (which is not in the first mentioned scale of colors), and changes finally to a splendid brown with green and red iris glitter. This last is a very durable coating, and may find special attention in manufactures, especially as some of the others are not very permanent.

Very beautiful marble designs can be produced by using a lead solution, thickened with gum tragacanth, on brass which has been heated to 210° Fah., and is afterward treated by the usual solution of sulphide of lead. The solution may be used several times.

Black Leading of Iron.

In these days of general diffusion of chemical knowledge, it is scarcely necessary to state that the "black lead" or "plumbago" of commerce is not lead at all, or any compound of lead, that it includes no lead whatever in its composition. Neither is it a carburet of iron, as is sometimes stated. It is simply carbon; pure plumbago is pure carbon, impure plumbago is impure carbon. Its proper name is graphite, that is, writing stone. I may venture to describe it as the softest of all true solids, and have often pondered wonderingly upon the apparently unnoticed, but very curious chemico-mechanical, paradox that the hardest and softest of all the solids existing upon this earth are, chemically speaking, the same substance: graphite and the diamond, being both carbon.

It is this wonderful softness, combined with persistent solidity, that enables us to smear it over any other solid surface, and thus obtain a solid paint, all body and no medium. For the class of castings to which it is commonly applied, where its application can be readily repeated, and where it is not exposed to the direct action of water, it is unrivaled as a protecting film to iron. Its chemical action, so far as it does act when cold, is reducing or anti-oxidising. Its color and tone are so similar to iron that Mr. Ruskin himself could scarcely make any æsthetic objections to its use, and the film is so marvellously thin that it obliterates nothing. I have never met with any attempt to estimate the thickness of a well brushed film of graphite, but I suspect that, if a hundred strata of such films could be piled in contact with each other, their combined thickness would fall short of that of the thinnest gold leaf.—*W. Mattieu Williams.*

The Magic of an Auctioneer's Advertisement.

The *Building News*, London, is responsible for the following:—An English country gentleman recently became tired of his house, and determined to sell it. He instructed an auctioneer, famous for his descriptive powers, to advertise it in the papers for private sale, but to conceal the location, telling persons to apply at his office. In a few days the gentleman happened to see the advertisement, was pleased with the account of the place, showed it to his wife, and the two concluded it was just what they wanted, and that they would secure it at once. So he went to the office of the auctioneer and told him the place he had advertised was such a one as he desired, and he would purchase it. The auctioneer burst into a laugh, and told him that that was the description of his own house, where he was then living. He read the advertisement again, pondered over the "grassy slopes," "beautiful vistas," "smooth lawn," etc., and broke out, "Is it possible? Well, make out my bill for advertising and expenses, for, by George, I wouldn't sell the place now for three times what it cost me."

HOT FILTERING.—The apparatus consists of a tube of soft sheet lead which can be wound around the funnel containing the filter in the form of a spiral. One end of the tube passes through a cork in the neck of a flask, in which water, or other liquid of higher boiling point, is boiled; the other end dips into a receiver into which the condensed liquid flows.

Final Test and Opening of the St. Louis Bridge.

The final test of the strength of the St. Louis bridge was made on the 2d of July, under the supervision of Capt. J. B. Eads, the chief engineer. He was assisted by Col. Henry Flad, Oscar Scheultze, Messrs. Klemm, Varrelman, Schmidt, Cooper, and Devon, with ten assistants, and Mr. Schaler Schmidt, of the Baltimore Bridge Company. Col. H. B. Carrington, United States Army, Professor of Dynamic Engineering at Wabash College, was also present, and expressed his satisfaction at the result of the tests. At a given signal there were fourteen locomotives ready to obey the command of Capt. Eads and Col. Flad and their assistants. At about 10 o'clock seven locomotives, crowded with people on pilot, cab, and tender, moved in a body, coupled together, and ascended the approach; and when arriving on the two 56 feet spans over Front street and the levee, east of the abutment pier, they halted, and by a signal notified the other caravan of seven iron horses to come up to the rack; and they followed up, and the test was begun in earnest.

The following is Capt. Ead's summary of the result of tests made upon the Illinois and St. Louis bridge with fourteen locomotives:

"Seven locomotives were placed upon one track of each span. This produced a deflection of 2½ inches on center span and 2¼ inches on each side span. Seven locomotives were then placed on each track of the west approach, and both trains of locomotives, fourteen in all, were moved out out abreast and simultaneously over each one of the three spans. The locomotives weighed from 35 to 51 tuns, averaging 40 tuns each, making 560 tuns in all. The two trains thus formed were stopped on each span, and the effects of this load carefully noted. The deflection of the middle span was 2½ inches; of each side span, 3 inches. The two trains moving abreast upon each arch was the severest possible test to produce distortion of the curve of each arch. Ten locomotives were then coupled together, and these were run over each track on each side of each arch of the entire bridge, covering the entire track of each span, and throwing the whole weight of the train, 400 tuns, on one side of each span. This test was applied to each side of the bridge, and produced the severest twisting strain to which each arch can be subjected. The vertical deflection produced by this test on the center span was two and one half inches. The locomotives thus coupled were run at a speed of ten miles per hour. The local traffic on the upper roadway of the bridge was uninterrupted during the progress of the tests. Various other observations in detail were made, noting the effects of the load on the arches as it entered upon and left the different spans, but this possesses no special interest to the general public. The result of the tests agreed almost exactly with the theoretical computations previously made, and the whole trial proved eminently satisfactory. The instruments failed to detect any side motion whatever during the tests."

The river is spanned by three arches, of which the central arch has a span of 520 feet, the other two of 502 feet each. The arches are composed of cast steel, and the bridge is really a double structure, consisting of two arches placed side by side. The arches are made of steel tubes, each twelve feet in length.

The formal opening of the bridge was celebrated on the 4th of July, with great enthusiasm. The display was finer than ever before witnessed at St. Louis. The procession was five hours in passing a given point. Addresses were made by Mayor Brow, ex-Senator Gratz Brown, Governor Woodson of Missouri, and Governor Beveredge of Illinois.

Contraction of Tyres.

M. L. Merlet proposes the following method of reducing the inner diameter of a tyre which has been unduly enlarged by the hammer or the rolls, so that it cannot be put on when hot in the usual manner. The plan consists of heating it to redness, and then plunging it horizontally but only to half its breadth in water, and leaving it there till quite cold. The operation is then repeated in the same position, after which the tyre is turned over and the heatings and plungings applied to the other half of the ring. The first cooling produces a contraction of which the half not immersed partakes, and thus undergoes a molecular retraction resulting in a reduction of diameter; of course the same is produced in the other half during the second operation. In this way a tire has been reduced 7 in 895. Four immersions instead of two will double the shrinking. In the same manner, a ring of Bessemer steel, which had not only enlarged under the hammer but had also become conical in form in the interior, was brought to the exact diameter by means of heating and immersing thirteen times successively, first the side that was contracted, and afterwards that which had become enlarged. In this case the correction amounted to nearly four inches, but the diameter of the steel ring is not given.

The Wear of Car Axles.

The standard car axle journals are 3¾ inches in diameter by 7 inches long. The old style was 3½x5½.

The superiority of the standard axle is illustrated by Mr. C. E. Garey as follows: "Two pairs of wheels, one with 7x3¾ journals, and the other with 6½x3½ journals, were left under the car in constant service, when I found it necessary to remove the wheels, as they were worn out, having run 65,734 miles. On examination, I found that the large journals had been worn off $\frac{1}{32}$ of an inch in diameter and ⅛ in length, but were perfectly straight, smooth, and equal in size, while of the smaller ones, namely, 6½x3½, one was worn off $\frac{1}{16}$ in diameter and the other a little less, and both were smaller in the center than at the shoulders; while the lateral wear was the same as that of the large journals. I find by experiment that bearings on 5½x3½ journals will run from 30,000 to 35,000 miles, while the standard bearings, judging from the past twelve months' experience, will run with safety 100,000 miles or more, and with much less liability of heating, as we have several cars running with standard axles, and have not yet had a hot box. These experiments were made with New York and Harlem Railroad baggage car No. 10."

FROM 57 TO 86 MILES AN HOUR BY RAIL.—Fast time was recently made by the "newspaper train," which left Jersey city nearly half an hour behind time, and made it all up before reaching Trenton. This distance—a fraction less than 57 miles—was run in 59 minutes, including a stoppage of over a minute at Newark and a moderation of speed at New Brunswick. There were some portions where the speed was more than a mile and a quarter a minute. Just beyond New Brunswick, five miles were run in three and one half minutes, which is at the rate of nearly 86 miles an hour. About a dozen passengers enjoyed this extraordinary ride.

THE PRODUCTION OF PRECIOUS METALS on the Pacific Slope reached, during the last quarter of a century, $1,583,644,934, of which California mines produced three fourths, nearly all of which latter was in gold. The amount obtained is now increasing yearly, partly from the opening of new mines, but chiefly from the introduction of improved methods of extracting the precious metals from the ores. The yield of the Pacific Slope, last year, was $80,287,436, against $70,236,914 in 1872. The increase is mostly in silver, a much more useful metal than gold, except for coinage.

NEW BOOKS AND PUBLICATIONS.

EARTHWORK MENSURATION, ON THE BASIS OF THE PRISMOIDAL FORMULA, containing a Simple and Labor-Saving Method of Obtaining Prismoidal Contents Directly from End Areas. By Conway R. Howard, Civil Engineer. Illustrated. Price $1.50. New York: D. Van Nostrand, 23 Murray and 27 Warren streets.

The author of this book has developed a new system of finding the contents of earthwork by prismoidal mensuration, and accompanied the treatise with tables and rules of application of admirable simplicity, so that any one who can approximate cubic contents by the rough method of average areas can obtain a more exact result by the use of the prismoidal formulæ here given.

REPORT OF THE BOARD OF OFFICERS ON GATLING GUNS OF LARGE CALIBER FOR FLANK DEFENSE. Ordnance Memoranda, No. 17. Washington: Government Printing Office.

In this document, the views we have expressed as to the efficiency of the Gatling gun are fully endorsed by a board of experts in artillery. Detailed accounts of very many trials are given, and the results, illustrated by target diagrams, once more prove the terrible destructiveness of the weapon, especially in open country and as a means of defense.

A NEW METHOD OF AMALGAMATING THE PRECIOUS METALS. By John Tunbridge. Newark, N. J.: Pierson, Brother, & Co, 188 Market street.

Mr. Tunbridge is an expert in metallurgy, several of whose communications have appeared in our columns, and we refer our many readers who are interested in the subject to the little pamphlet now before us, as detailing some original views of a most important subject.

THE ELECTRO-ASTRONOMICAL ATLAS. By Rev. J. W. Spoor, A.M. Illustrated. Price $2. Rochester, N. Y.

The object of the author of this work has been to present the elementary principles of astronomy in a simple, popular form, as readily comprehensible by children as the ordinary primary text books on geography. We think that his efforts have been attended with excellent success. The volume before us is beautifully illustrated, written in a clear, concise style, in questions and answers, and presents the newest and most authentic information regarding the science. The diagrams are unusually complete and accurate, one exhibiting, at a single view, the entire solar system; while the other illustrations, original and selected, some of which plates are colored, are well calculated to convey correct ideas of the science of astronomy, in which, of late, there is so much interest.

Recent American and Foreign Patents.

Improved Sash Pulley.

Stiles E. Maxon, Long Branch, N. J.—The pulley case is cast in one piece and is made oval, to fit in the oval end of a mortise. The lower end is made concave to fit the fastening screw, which is tapered and has a small beveled head to arrest it when it comes flush to the stile of the frame; also to secure the lower end of the case. The screw being tapered, its threads will be pressed into the wood by the case when it comes into position, so as to insure its holding firmly.

Improved Loom Picker Spring.

William E. N. Potter, Lewiston, Me.—This invention relates to mounting a spring pulley (around which is wound the strap that connects it with the picker stick) on a crotched stand having a slotted base to adapt it to be secured to a screw stud in a vertical or horizontal position. It also relates to the means of securing the strap to the pulley case by a hook fastened in the slot in the face of the pulley by its bent portion and the straight extension, said extension being pressed in between the two coils of the spring, and kept in place by them. This arrangement allows of readily putting in the hook and taking it out, so that a broken or worn-out hook can be readily replaced.

Improved Watch Regulator.

Joseph W. Hurd, Grand Crossing, Ill.—The object of this invention is to furnish means for regulating watches by the application of a micrometer screw, so as to vary the hair spring, and consequently the running of the watch, in the most delicate and precise manner.

Improved Apple Crib.

James M. Chaplin, Middleport, N. Y.—This is an improved apple house or crib for use in the orchard, for the purpose of keeping or storing apples therein as they are picked from the trees until they are to be sorted and barreled for market. Hitherto it has been the custom with orchardists to pick their apples and put them in large piles on the ground, or directly into barrels. In the latter case, the apples will sweat, mold, and mildew, and, therefore, not keep as well, so that considerable loss is caused in both cases. The present invention consists of a crib constructed of a raised bottom with detachable ends, and intermediate cross sections, and adjustable sides covered by a roof, the whole being connected in suitable manner, so as to be readily put up and stored away after use.

Improved Toy.

Mortimer C. Lee, New York city.—This is a toy cart with a figure of a horse's head and neck (one or more) attached to the axle thereof, propelled by means of a tongue, and guided by means of reins. A pull upon either line changes the direction, and the effect is very similar to that of guiding a live horse, which makes the toy exceedingly interesting to the juvenile driver.

Improved Heating Apparatus.

Gustavus Stevens, East Tawas, Mich.—This invention consists in a new and improved method of heating and ventilating rooms, by drawing pure air from outdoors by means of a bellows actuated by a large clock gearing, and of forcing the same through heating coils enclosed in a cylinder. Said cylinder is provided with a flue in its center, up which passes the flame of a large lamp, by means of which the coils are heated, and is also enclosed in an outer case which may contain either water or air. By means of this arrangement the air in a room is maintained at a uniform temperature and a constant ventilation secured.

Improved Fence.

Jacob Haish, De Kalb, Ill.—This invention consists of a sheet metal fence rail spirally twisted and provided with spikes excised from the body thereof, and turned on opposite sides; also in a fence post made of two closely joined metallic rods bent outward at corresponding points near the base.

Improved Hay and Straw Cutter.

John A. Cornish, Marshfield, Mo.—This invention consists in improving hay and straw cutters by the application thereto of a grinding plate that takes up the wear on the knife as fast as it occurs, a peculiar support for the cutter blade, and also novel means for operating the feed rolls. These cause the machine to operate with less labor and to cut the hay or straw more uniformly than is usually done.

Improved Piston Packing.

Stillman E. Chubbuck and Isaac Y. Chubbuck, Boston, Mass.—This invention consists in the improvement of steam packing for pistons, by combining, with the spring pressers that hold the cut rings in place at their proper expansion, non-radial hub arms and overlapping ring studs to prevent lateral displacement, and also in the peculiar construction of the heads of spring pressers, so that they may act at right angles to one ring and exert also a lateral pressure upon the other, the two sets of rings that break joint with each other being thus held perfectly steamtight against the piston cylinder.

Improved Circular Saw Planing Knife.

Joseph T. Tunis, St. Michael's, Md.—This invention consists in a new and improved method of planing down the kerf upon sawn material during the operation of sawing, by inserting in grooved holes near the circumference of the saw detachable planing knives having symmetrical sides and projecting alternately on opposite sides of the saw just far enough to plane down the kerf without wasting the material, the said knives being made with symmetrical sides so that they may be taken out and reversed when one edge becomes dull or blunted.

Improved Bed Lounge.

Frank Johnson, Omaha, Neb.—The seat is hinged at the front part. The head part is hinged to an inclined head piece of the lounge frame, and is to be swung in an outward direction like the seat. The inside of lounge frame and seat are provided with suitable mattresses, the cushioned head and seat being at the under side when the lounge is used as a bed, and thereby not exposed to rapid wearing out. The hinged section is provided with folding legs. The face board is detachable, and has to be taken off when the lounge is folded into a bed. It closes the open part between the seat and frame, and is firmly applied to lugs which enter recesses, and pass along extension grooves by sliding a board sidewise toward the head of the lounge, retaining it firmly thereon till detached by sliding it in opposite direction for opening the lounge. The lounge is quickly and easily changed into a bed, and *vice versa*.

Improved Binder Attachment for Harvesters.

Willis Wheelock, Decorah, Iowa, assignor of one half his right to William T. Baker, same place.—This is an automatic raking attachment for harvesters, so constructed as to collect the cut grain into a gavel and raise it to the binders' table. Suitable construction enables the binder to equalize the gavels by allowing the rake to operate only when a proper amount of cut grain has fallen upon the platform. The rake stands still for a short time at each end of the platform and then moves across the platform in a straight line, sweeping the cut grain before it. As the rake head moves back its forward part is raised out of the falling grain. The forward part of the rake head, while sweeping the grain before it, is kept from rising. To the inner edge of the platform is pivoted an apron, which is connected with the spring so as to be lowered as the spring is forced down by the advancing rake, and allow the gavel to pass to the receiver. As the rake head rises to return, the apron is raised by the spring to prevent the grain from falling from the platform, while the receiver is raised to deliver the gavel.

Improved Carriage Wrench.

Wilbur F. Rowe, Minneapolis, Minn.—The object of this invention is to provide, for the removing and replacing of the axle nut of carriages, an improved wrench by which the same can be done without soiling the fingers or letting the nut come in contact with dirt. A carriage wrench slides on the shank of an axle nut socket. The shank is partly polygonal, partly round, and is provided with a button or knob, by which the nut and socket may be turned, while the starting or finishing turns of the nut are given by the lever part of the wrench.

Improved Burial Case.

Jacob H. Forshay, New York city.—By an improved mode of fastening the lid may be applied and taken off in a few minutes without difficulty, the connection being made by fastening clamps which are provided with tapering grooves, and placed over the dovetailed wedge strips at the sides and ends of the body and cover of the case. The adjoining parts of the body and cover are provided with interlocking grooves and tooth shaped projections, which extend around the whole circumference of the case, and have rectangular extension recesses, into which corresponding continuous strips of rubber are applied. By placing the cover on the body of the case, the apexes of the projections embed themselves tightly into the rubber lining, and form thereby a perfect and hermetically sealing joint as soon as the fastening clamps are applied.

Improved Mode of Connecting Pitmen to Fly Wheels.

James M. G. Mouck, Drakeville, Iowa.—A wheel has curved arms, one of which is provided with a slot. This construction adapts it for attachment of a pitman, by means of a wrist pin which passes through the end of a bar that is pivoted to the rim of the wheel, and is clamped in any adjustment by a screw nut. The slot is constructed upon a curve of a circle whose radius is the pivot of the bar. The object of the latter is to compensate for the loss, and prevent the breaking or giving way of the slotted arm, and also to overbalance the wheel on one side, so that it has no dead center.

Improved Toy Gun.

John C. Todd, Toronto, Can.—This invention consists of a disk-shaped piece of suitable material, provided with a groove along the circumference in which, by suitable fastenings, an elastic band is placed. A diametrical perforation of the disk serves as a guide chamber for the dart, the disk being provided at one end thereof with a segmental recess for easily taking hold of the end of the dart and the elastic band, and thus, by suddenly extending and then freeing the latter, sending out the projectile.

Inventions Patented in England by Americans.

[Compiled from the Commissioners of Patents' Journal.]

From June 12 to June 18, 1874, inclusive.

COOKING, ETC., BY LIQUID FUEL.—J. H. Thorp, New York city.
COMPOUND ENGINE.—W. Baxter, Jr., Newark, N. J.
DISTILLING EXTRACTS.—F. Walton *et al.*, New York city.
DRESS PATTERNS.—E. Butterick & Co., New York city.
FIRE ARM BAND HOOK.—E. Gaylord, Chicopee, Mass.
MAKING ICE, ETC.—C. P. N. Weatherby (of New York city), London, Eng.
OXIDIZING ANTHRACENE.—C. Rumpff, New York city, *et al.*
PROTECTION FROM FIRE, ETC.—J. A. Coleman, Providence, R. I.
RAILWAY CAR SPRINGS.—J. S. Barney, New York city, *et al.*
SEWING MACHINE ATTACHMENT.—J. J. Thompson, Goshen, N. Y.
SPIKE MACHINERY.—N. Tay, Medford, Mass.
SUPPLY VALVE.—W. Craig, Newark, N. J., *et al.*
TEMPERING STEEL [illegible], etc.—J. F. Simonds *et al.*, Fitchburg, Mass