The Royal Aquarium at Westminster.

The large building which has been slowly rising at Westminster, on the ground facing the Abbey and the Houses of Parliament, and which is to present under one roof the varied attractions of an aquarium, a summer and winter garden, with a museum and picture gallery, in addition to the more commonplace but useful features of a reading room, library, and restaurant, was formally opened on January 22 by the Duke of Edinburgh, in the presence of a large gathering of ladies and of the members of the society under whose auspices the scheme has been so far brought to a successful issue. The building, which has been erected by Messrs. Lucas, from the plans of the architect, Mr. A. Bedborough, stands on a site of three acres, stretching from the chief entrance, near the Westminster Hospital, as far as the St. James' Park station on the Metropolitan Railway, the freehold of the land having been secured by the society. It will give some idea of the extent of the center or main transept, which is to be used for promenade and concert purposes, and in which the opening ceremonial took place, if we state that it is 8 feet greater than the principal transept of the Crystal Palace, reaching to 160 feet. The hight from the floor to the level of the roof is upwards of 70 feet, and round the building are the galleries, which are used for the fine art exhibition and as a museum. So far the architect has proceeded on well-worn lines, and has produced a handsome and spacious hall, suited alike for promenade or for musical performances. This, however, although the chief part of the structure, is not to be its main attraction; for it is in the aquarium proper that the great *raison d'être* of the undertaking, according to the views of its promoters, will be found. The tanks for the reception of the fish are of enormous extent, but at present, although complete, they are untenanted. The system on which they are to be supplied will insure a constant circulation of water; and as it will thus be kept in freshness and comparative purity, it is anticipated that the results will be even more satisfactory than in those aquaria already opened in this country and on the continent, where the water is never changed. This method of keeping the water in circulation has been invented by Mr. W. A. Lloyd, the naturalist. There are thirty-one show tanks, nine for fresh water fish and twenty-two for sea water fishes and animals, in addition to the marine tanks which are to contain the food supply of the permanent inhabitants, and to serve for the segregation of the sick—forming, in fact, a sort of hospital. The water for the tanks, consisting of about 600.000 gallons of sea water and 200,000 of fresh, is to be supplied from reservoirs below the center transept, to which it is returned after flowing through the tanks. Another feature of the undertaking—and probably one of the most attractive parts of the programme—will be the daily concerts by an orchestra of forty-eight performers, selected by Mr. Arthur Sullivan, and conducted by Mr. George Mount. Classical concerts, personally directed by Mr. Sullivan, are to be given at intervals. Following the system recently introduced at the Crystal Palace and the Alexandra Palace, a theater forms part of the scheme, and in this building dramatic performances will be given.

English Products in the United States.

We called attention, recently, to the collapse of the English steel rail trade, which in this country at the present time is totally dead, no rails having been imported hither from Sheffield for over nine months. From a statement of exports from the United Kingdom to the United States, lately issued by the Chief of the Bureau of Statistics at Washington, the following figures are given, indicating the exports in January, 1875, and in the same month of the present year:

	1875.	1876.
Hardware and cutlery	$56,296	$34,765
Pig iron and steel, tuns	2,637	1,948
Bar, angle, bolt, and rod iron, tuns	242	240
Railroad iron, all sorts, tuns	2,376	23
Hoops, sheets, boiler and armor plates, tuns	269	100
Steel, unwrought, tuns	793	640

The immense fall in railroad iron shows that the decline is not confined, in that class of exports, to steel rails alone, while the very small amount of other metal goods brought over indicates that the trade has shrunk greatly.

Nor is this decline visible in metal industries alone. The comparative returns for the two months show a falling off of over a million yards of cotton goods; in haberdashery, a reduction of over fifty per cent; over a thousand tuns out of eight thousand in tin plates; a million yards of linen (ten million odd to nine million odd). In silk goods there is a falling off of fifty per cent; the same in carpets, in writing and printing paper, in beer and ale, and in spirits. About the only exports on the list which hold firm are china ware, wall paper, articles of silk mixed with other materials, stationery other than paper, and worsted cloths. The value of the English machinery imported hither, on the other hand, has nearly doubled, from $73,475 to $126,370; but neither of these sums is large, and probably the increase is due to apparatus brought here in anticipation of the Centennial.

Etching Process.

In Ackermann's *Gewerbezeiting*, Herr Fichtner gives an account of a way of producing etchings in relief by asphalt. Select pieces of asphalt which do not melt at 90°, and are difficult to dissolve in turpentine; dissolve five parts in a mixture of ninety parts of benzole and ten parts of oil of lavender; the benzole must be separated by distillation from any impurities that would render it too sensitive to light(?), after which it must be thoroughly drained before being used. The oil must be perfectly free from water. Coat a perfectly clean and smooth zinc plate with the varnish, allowing the latter to run off like collodion; then dry in a horizontal position in the dark. Expose the plate under a negative from twenty-five to thirty minutes in the sun, or three or four hours in daylight, according to the sensitiveness of the asphalt film, which must be ascertained by experiment. The exposed plate is then developed with rock oil, to which a sixth of its volume of benzole has been added; the oil is poured over the plate and moved about until the whites are perfectly clean; the plate is then washed under a jet of water, dried in the light, and etched with diluted nitric acid. There must be a careful avoidance of air bubbles.

Improvement in Electric Illumination.

It is well known that the electric light is due simply to the electric current heating the medium it passes through; and the more resistance is offered to the current, the greater is the heat developed. The great intensity of the ordinary electric carbon lamp is owing to the badly conducting layer of atmosphere between the carbon points, and the layer being very much heated makes the carbon burn with a white glow. By reason of the great resistance of this layer of atmosphere, which only a powerful current can overcome, the light must necessarily be a very brilliant one.

It is possible, without the aid of air or gas, to make a solid body quite hot, as, for instance, in the case of a platinum wire; the illumination thus produced is, however, weaker and more uniform, and may be intensified or diminished. But it cannot be applied practically by reason of its great expense, and because, if the heat becomes too intense, the wire is apt to fuse. For this reason, the idea struck Ladiguin to replace the platinum wire with thin bars of graphite or carbon. This graphite possesses, at an equal temperature, much greater radiating properties than platinum. The heat capacity of the latter is twice that of the carbon, so that the same temperature will heat a thin bar of graphite to double the degree which would be attained by a platinum wire of the same dimensions under similar circumstances. Moreover, the electric resistance of the carbon in question is about two hundred and fifty times that of platinum, and the carbon rod may be fifteen times as thick as a platinum wire of the same length, supposing the current is to give the same amount of heat. Finally, there is no disposition for the carbon to melt, even at the highest temperature.

For these reasons the Ladiguin method of electric illumination may be regarded as a most valuable one, as, indeed, it has already proved to be. The only drawback to it seems to be that the carbon gradually combines with the oxygen of the atmosphere and burns away; but this defect the inventor has overcome by confining the carbon in an airtight glass, from which the oxygen has been removed in the simplest manner, and replaced by nitrogen.—*Polytechnisches Notizblatt.*

Remarkable Coal Mine Explosion.

The anthracite coal region in the vicinity of Wilkesbarre, Pa., was the scene of a very remarkable gas explosion on March 6, 1876. The following particulars are from the New York *Herald*:

The explosion occurred in the mine known as the Prospect shaft, and owned by the Lehigh Valley Coal Company. The mine has been in operation about five years, and has always had the reputation of making more gas than any other mine in the anthracite coal region. In consequence the utmost precautions have always been taken against an explosion while the mine was in operation, by applying the best means of ventilation known. On the night of the 19th of January last, the mine took fire from the ignition of a current of gas, just after a blast had been made by a miner, and it was found necessary to force water into the mine for three weeks, until it was estimated that nearly ten millions of gallons of water had been poured in.

Operations were lately commenced to take out the water, and this was done by means of buckets holding 1,100 gallons each, which were fixed in the shaft and raised and lowered alternately. It was calculated that about 60,000 gallons were raised in this way every twenty-four hours. The shaft has a depth from the surface of 600 feet. When the work of bailing the mine was commenced, there were about 100 feet of water in the shaft, showing that the chambers and gangways below, which traverse a space of about a half mile square, were all filled. As the water was lowered, the gas, which had been forming constantly since the fire, began to push its way through the water. It is calculated that the water was charged with millions of cubic feet of gas, more or less; the gas escaped up the shaft. The work of bailing continued until about nine o'clock on the evening of the 6th of March, when suddenly a low, rumbling sound was heard below ground; and in a moment after, an explosion like a hundred earthquakes broke on the air, and sent its terrible echoes along the valley for miles in every direction. The shaft is located on a high hill, and instantly a stream of fire, forty feet long and twelve wide, shot up into the air for a distance of 500 feet. The whole country around for miles was brightly illuminated by this vast column of burning gas. The houses in the vicinity of the shaft shook like reeds at the moment of the explosion, and thousands of people turned out in terror to see what had caused the unusual commotion.

At Wilkesbarre, a little distance in the valley below, the loud report was heard, and the great flame of light, shooting heavenward above the shaft in the mountain, caused the greatest excitement, which grew momentarily as the illumination continued. Those at a distance could only conjecture what the cause of the Vesuvius counterpart was. Many people really believed that a volcano had broken loose, and terror seized upon more than one nervous witness. The tremendous stream of fire shot up from the shaft for three hours, loud explosions occurring every fifteen minutes. In the meantime thousands of excited people from all sections flocked to the vicinity of the shaft, and stood mute witnesses of the greatest sight which any eye had ever looked upon. It is supposed that as the water was taken out of the mine, the pressure below became lighter, and the gas, which had been pushed back by the weight of the water before, now mingled with the flood, and to such an extent that the water itself was capable of being ignited at the touch of a match; this must have been the case, for one of the men, who stood near the mouth of the shaft with lighted lamp when a bucket of water came up, was splashed by the overflow, and a drop falling in the flames of his lamp instantly caught fire, and in a moment the frame heading which stands over the shaft took fire; and as the sparks dropped into the deep pit below, they ignited the gas there generated, and of course an explosion followed.

Successful Progress of the Mississippi River Jetty Works.

An Associated Press telegram of March 5 states that the three-masted schooner Mattie W. Atwood, 783 tuns, with cargo of 2,250 bales cotton, and drawing 13½ feet, was put to sea through the jetty channel at South Pass on that morning. This is the first merchant vessel that has passed through the jetty channel, where, seven weeks ago, there was barely 7½ feet of water; now there is 14 feet.

"Constant soundings and surveys are being made," says the New Orleans *Times*, "and we know from these that, in many places right on the bar, where there was formerly six or seven or eight feet of water, there is now eighteen and twenty and twenty-three feet. This will soon be practically demonstrated by the passage of the deepest laden vessels. 'Tis only a question of a few days or weeks, not months. The great engineer, Eads, and the indefatigable builder, Andrews, are to be congratulated on the success of this most important national work, and New Orleans cannot do too much honor to these men for what they have done toward consummating her future prosperity and commercial preeminence."

Giffard's Cold Air Engine.

The principle of the cold air generators is well known. When air is subjected to compression, heat is developed. When deprived of the heat, and subsequently allowed to expand, it re-absorbs heat so eagerly as to produce a notable lowering of the temperature, which is susceptible of application to a variety of practical purposes. A new description of airtight cylinder, new joints, and a new stuffing box have enabled M. Giffard to so far improve upon previous machines that his cold engine, when driven by an ordinary steam engine, will make 20 lbs. of ice for each lb. of fuel burned.

New Property of Glycerin.

R. Godeffroy, on examining a chemically pure glycerin from the Apollo Japan Works in Vienna, found that when heated to 150° it took fire, and burned with a steady, blue, non-luminous flame, without diffusing any odor or leaving a residue. The glycerin had the specific gravity of 1·2609. This property enables glycerin of lower specific gravity to be burned by means of a lamp wick.

DECISIONS OF THE COURTS.

United States Circuit Court---Northern District of New York.

STOVE PATENT.—ESEK BUSSEY AND CHARLES A. MCLEOD *vs.* JAMES WAGER; ESEK BUSSEY AND CHARLES A. MCLEOD *vs.* HICKS AND WOLFE.

[In equity.—Before WALLACE, J.]

A new combination, producing new and useful results, and not merely an aggregation of the results, due to the independent action of the several parts, is a patentable invention.

Bussey combined a reservoir in such relation to a top plate and partial back plate that the reservoir performed both the functions of a reservoir and of a partial back plate of a stove—a new result.

Liberal construction should be accorded patents, so as, if possible, to secure to an inventor what is really his invention.

The description and drawings of an original patent may be looked to, to disclose the real invention of a patentee, when the original claims are defective or the reissue claims obscure.

This was a bill in equity filed against the defendants for infringement of reissued letters patent, No. 5,435, dated June 3, 1873, granted to complainants for improvements in reservoir cooking stoves.

[*Esek Cowen* and *George Harding* for complainants.
Samuel A. Duncan and *George Gifford* for defendants.]

Recent American and Foreign Patents.

NEW MECHANICAL AND ENGINEERING INVENTIONS.

IMPROVED CAR COUPLING.

Daniel B. Palmer and David S. Kepler, Chambersburg, Pa.—The object of this invention is to provide an improved automatic coupling for cars. The principal features of the invention consist in a pair of hook-shaped, vertically moving jaws, held together by springs and operated by levers, in combination with a long pivoted link permanently attached to one of the jaws, each set of jaws carrying one of said links. The invention also consists in the arrangement of the drawbar, and in a set of automatically releasing levers which, when the jaws are opened by the hand lever, take the link and lift it into such a position as to allow the link to be withdrawn when the cars are to be separated.

IMPROVED APPARATUS FOR TRANSMITTING POWER.

Joseph L. Crabtree, Flintstone, Md.—This is mainly an arrangement of parts to form a wheel, in combination with a cylindrical end flange, carrying interior cogs, which gears with a pinion upon an eccentric shaft, to transmit to greater advantage the power received. The device is adapted to over and under shot water wheels.

IMPROVED PIPE COUPLING.

Isaac Johnson, Chicago, Ill.—This invention relates to a novel mode of connecting the sections of a pipe made of lead and sheet metal, and consists in the employment of a hollow connecting piece annularly grooved near each end, the metal of each pipe section being quickly pressed into the groove. When the tool is pressed and turned around the pipe, the metal is drawn forward and the pipe shortened by filling the grooves, without pulling apart the ends.

IMPROVED EAVES TROUGH MACHINE.

Charles A. Codding, Dowagiac, Mich. This invention relates to certain improvements in machines for making eaves troughs. It consists of a platform placed upon rests or rockers, upon which platform is firmly attached a half cylinder. On each edge of the half cylinder is arranged a set of standards, through which rods run for the support of the former lever and their gripe attachments. These levers are made in a semi-cylindrical form, one end having a shank through which a hole is made for attachment to and lateral adjustability on the supporting rod. The under side of this shank also bears upon the bead or tube of the trough, forcing it down to the platform. The other end of these levers has a shank the upper side of which is beveled, upon which beveled face bears a set screw or bolt in the V-shaped gripe attachment, which latter are pivoted upon a supporting rod and made laterally adjustable.

IMPROVED FEATHERING PADDLE WHEEL.

Ross Forward, Cincinnati, Ohio.—This invention relates to the paddle wheels for use on steamers, and adapted to work at any desired depth beneath the surface of the water, thereby increasing the resistance to the paddles or blades, at the most effective point for propelling the vessel, and lessening the power required to move it at a given speed. The paddles of each wheel are pivoted transversely between two circular rims, also weighted on one side, below the pivots, and combined with mechanism for locking them at various angles, whereby they are made capable of assuming and maintaining an inclination to the surface of the water, both on entering and leaving it, and a vertical position while immersed in it.

IMPROVED EARTH AUGER.

William McK. Burns, Concordia, Kan.—This improvement consists in a novel construction and arrangement of the cutting bit, also of the contrivance of the reamer and the case. The bit consists of a long spiral steel plate, formed, for the most part of its length, on an acute pitch for carrying the earth away from the cutting edge quickly, so as not to clog on the bit, while it is carried to a much more obtuse pitch on the point, corresponding to the required rate of movement of the auger into the ground. Devices are added whereby the bucket may be hauled up separately.

IMPROVED GAS REGULATOR.

David B. Peebles, Edinburgh, Scotland.—The wet governor consists of a bell working in a tank in water. Around the bottom of the bell a float is made, which tends to raise it when immersed, and from the top and center of the bell is suspended a valve, the seat of which is fixed on the top of the vertical inlet pipe of the governor. On the bottom of the valve is arranged a closed tube about one and a half times its diameter, and this works inside a tube which communicates with the water by means of a pipe passing laterally through the vertical inlet and outlet pipes, and fixed thereto by nuts. The object of this arrangement is to give a pumping action to the valve when it moves, which tends to steady the bell and obviate bobbing or oscillation by the gas waves. Another important feature of the invention is the manner in which the governor is acted on so as to increase, diminish, or maintain pressure. In any part of the inlet gas pipe a small tube is fixed; and in the casing of the governor, preferably as near the governor as possible, another small tube is fixed. These tubes are connected to a small dry or wet governor. Another tube connects the chamber above the bell with the outlet pipe, and into this tube is inserted a disk of tin, through which a small hole is pierced. Instead of loading or unloading the bell of the large governor, in the usual manner, with weights, the small governor only requires to be adjusted to give any desired pressure.

IMPROVED APPARATUS FOR CHARGING RETORTS.

Joel F. Rice, Louisiana, Mo.—In order to prevent loss of gas and also cracking of retorts by sudden change of temperature, charges, holding a large quantity of coal and provided with devices for operating them quickly, have been devised, and, to some extent, adopted in practice. This invention is an improvement in this class of apparatus, and consists, chiefly, in the combination with a charger formed of a tube or cylinder (open on its upper side, and provided with means for reciprocating it horizontally), of a plug or stop device, and means for holding the same stationary, in order to force the coal out of said charger, as the latter is being drawn out of the retort.

IMPROVED WRENCH.

R. N. Collingsworth, St. Louis, Mo.—This invention consists in providing an ordinary carriage wrench with an arm, projecting laterally or at right angles from the shank thereof, and having a socket in its outer end to adapt it for application to nuts of shaft couplings, etc. The said arm also answers the purpose of a handle by which to rotate the wrench when applied to the nut of a carriage axle.

IMPROVED OIL CUP FOR JOURNALS.

Amer R. Yost, Somerset, Ohio.—This invention relates to an improvement in that class of lubricators which are permanently attached to a shaft or axle and provided with a device for forcing the lubricant out of the reservoir between, or in contact with, the friction surfaces. The invention is embodied in a cylindrical cup or reservoir secured to the axle, an adjustable screw cap therefor, and a plunger formed of a spiral spring, and a piston which is hinged thereto. The springstem, or body of the plunger, is compressed by screwing the cap down on the tube, and the oil or other lubricating matter is forced out by the reacting force of the spring. The piston is hinged, to adapt it to turn downward, and thus prevent suction when being drawn out the tube.

IMPROVED CAR WHEEL.

Sebastian Stutz, Pittsburgh, Pa.—In this wheel the nave or hub is closed at the front by a cap cast in one piece with the body of the wheel, and the pipe box is inserted at the inner end and provided with a radial flange which adapts it to be secured to the hub by screw bolts. Passages or chambers are formed between this box and the hub proper, etc.; the lubricant circulates freely through them and in contact with the friction surfaces. The lubricant is supplied through an opening in the aforesaid cap of the hub.

IMPROVED SAND PUMP.

Edward F. Andrews, Augusta, Ga.—This invention relates to an improved pump adapted for collecting and removing sand, mud, and such like matters from wells, without at the same time removing any water. The pump barrel is formed of two parts, a piston chamber and a sand or mud chamber. These are separated by a strainer or sieve-like diaphragm, so that the sand and mud, drawn up with the water through vertical tubes arranged in the lower chamber, are prevented from passing up into the piston chamber along with the water, but deposited in said lower chamber, from which they may be discharged when the pump has been drawn out of the well. The water is discharged from the piston chamber while the piston is working.

IMPROVED TIGHTENER FOR ELEVATOR BELTS.

Peter H. Zacharias and John M. Swift, Ann Arbor, Mich.—An end clevis of a lever is fastened to one part of the belt, and the free end of said part is carried through a buckle on the other portion of the belt, and thence to a clevis on a hanging clamp attached to the lever. The belt is then tightened by raising the lever, and is secured by the tongue of the buckle entering a suitable hole.

IMPROVED FEED WATER HEATER.

Cassius R. Shepler, Port Perry, Pa.—This invention relates to a novel construction of feed water heater for steam boilers, which is also designed to operate as a boiler washer to prevent the accumulation of mud in the bottom of the same. It is a well known fact that in all boilers there will be, in spite of mud drums, an accumulation of mud in the bottom of the boiler, which prevents the water from coming into direct contact with the metal, which latter (becoming very much heated) frequently results in a disastrous explosion. This is especially the case with large longitudinal boilers and boilers used upon the western rivers, where the water is always more or less impregnated with sediment. The invention consists in a series of nozzles arranged in the bottom of the boiler, through which the feed water is delivered in jets against the bottom of the boiler, and the metal kept clean and free from an accumulation of mud at the points where it has a tendency to settle. The invention also consists in the peculiar construction of the feed water heater whereby the water is retained in the steam space for a longer time than usual.

IMPROVED CAR COUPLING.

John S. Purnell, Berlin, Md.—This invention relates to that class of car couplings which automatically couple upon being brought together. It consists in the peculiar construction and arrangement of devices in which a wide coupling pin with a curved face and shoulder is pivoted upon a horizontal detachable bolt or pin in the slotted drawbar, and is provided with an upper extension above the drawbar, against which a spring bears to restore and hold the pin in vertical position after being deflected by the entering link. The drawbar is provided upon the interior with a projection which holds the link horizontal, and also operates as a stop to the backward movement of the pivoted pin, thus preventing too great a strain upon the spring.

NEW AGRICULTURAL INVENTIONS.

IMPROVED PLOW.

Asa H. Piland, Margarettsville, N. C.—This invention relates to certain improvements in plows of that class in which one or more detachable sweeps are employed for the cultivation of cotton and corn in the earlier stages of its growth; and it consists in the peculiar construction of a combined moldboard and sweep, made in a single piece in the shape of a bat's wing, and adapted to be used at once as a moldboard and sweep.

IMPROVED CRANBERRY SEPARATOR.

John Buzby, Moorestown, N. J.—The object of this invention is to provide an improved machine for cleaning cranberries and separating the sound from the unsound or otherwise defective ones. This object is attained chiefly by means of inclined shelves or plates, upon which the berries are allowed to fall, and from which they rebound. The sound ones, being hardest, bound farthest, and thus pass into a different receptacle from the unsound ones. For the details of construction and arrangement of parts, reference must be made to the patent.

IMPROVED FERTILIZER.

Albert G. Griffith, Baltimore, Md.—The invention relates to an improvement in soil fertilizers of the class in which a suitable acid is employed to fix the nitrogenous matters contained in fecal substance, and thereby produce a compound which is so far free from noxious and offensive odors as to be adapted for handling and transportation in casks or boxes, like gypsum and other dry fertilizing substances. Horse manure forms the base of the compound, and to it are added certain proportions of sulphuric acid, bone dust, and Mexican guano. The product combines the highest proportions of nitrogenous and mineral elements which can be safely united in a fertilizer.

IMPROVED GRAIN DRILL.

Truman A. Hill, Jefferson City, Mo.—This invention relates to certain improvements in grain drills, and it consists, first, in two rock bars which are connected with the parts which conduct the grain to the earth, and are geared together by means of toothed segments, so that when actuated by a connecting rod they cause the alternating spouts to reciprocate in opposite directions; second, in the combination with the said rock bar of a clutch mechanism for throwing them in or out of gear; third, in the combination with the driving wheels of a worm and pinion gearing, and a graduated face and index hand for the purpose of determining the amount of ground seeded; fourth, in the peculiar construction and arrangement of the seeding devices; and fifth, in the means for connecting and disconnecting the same from the actuating mechanism.

IMPROVED FERTILIZING COMPOUND.

G. J. Popplein, Baltimore, Md.—The invention relates to that class of fertilizing compounds that are intended to replace, cheaply and conveniently, the elements that form the constituent parts or food of plants, and that have been eliminated therefrom by previous cropping, or are absent or deficient from some natural cause. The compound consists of tripoli united with soda or potash, both minutely subdivided and intimately mixed in proportions to suit the requirements of each particular crop.

IMPROVED COMBINED CORN PLANTER AND CULTIVATOR.

Henry H. Balding, Terre Haute, Ind.—This includes a number of useful devices whereby a corn planter is combined with an ordinary cultivator, so that the latter machine may be used for planting corn, as well as for its regular work. The novel features relate mainly to points of mechanical construction.

IMPROVED CULTIVATOR.

James A. Price, Houston, Tex.—This cultivator is provided with rear adjustable side beams, one placed in advance of the other, on opposite sides of the main beam, pivoted in front and curved backward therefrom. It may thus be readily adjusted for cultivating rows of plants of varying widths.

NEW WOODWORKING AND HOUSE AND CARRIAGE BUILDING INVENTIONS.

IMPROVED GATE.

Van Rensselaer Cole, Reedtown, Ohio.—The panel of this gate slides to and from the latch post on friction rollers, and is mounted on a triangular frame hinged to the pivot post. The said frame is attached to the post by means of a peculiar form of hinge, and the panel may be detached from the rollers to set it higher or lower, so that it may swing over snow or other obstructions.

IMPROVED TILE ROOF.

Jonas Smith, Lebanon, Ky.—The greater durability and dryness of tile and metal-covered roofs, as well as the greater protection they afford against fire, have tended to rapidly extend their use in recent years, even in localities or districts subject to no legal restrictions in respect to the materials of which buildings are composed. The present invention is an improvement in this class, and relates to an improved form of tile or metal plate, and means of fastening for the same, whereby an economy is effected in the cost of the roof covering, its weight lessened, and the attachment of the individual tiles or plates rendered more secure than heretofore.

IMPROVED METHOD OF ATTACHING HUBS TO AXLES.

Alden B. Brown, Comstock, Mich.—This inventor proposes a combination of a threaded band with the axle box, having corresponding and interlocking ring flanges, and the axle having an enlarged threaded collar. By this construction the oil cannot get out, and dirt and sand cannot get in to wear the axle arm and box.

IMPROVED SAWMILL DOG.

Henry Williamson, Bay City, Mich.—The invention relates to an improvement upon the sawmill dog shown in patent No. 150,534, and relates to the construction and arrangement of parts whereby the sliding bar which carries the dog is attached to the frame and supported by its operating lever. This forms a simple lever power dog which is adjustable to logs of any size.

IMPROVED VEHICLE SPRING.

Silas Newcomb, Pike, N. Y.—The invention relates to an improvement in the class of wagons unprovided with a reach, and consists in combining rearward extended torsion springs and pivoted or hinged stay bars with the body of the wagon. The rear axle is therefore separated from the wagon body to the extent of such increase in the size of the arcs of which said springs and stay rods are radii. These arcs so far correspond that the axle is maintained in a practically vertical plane, and hence the bolt connections between it and the springs are not strained at each vertical vibration of the wagon body.

IMPROVED FOLDING TABLE.

George K. Hoff, Philadelphia, Pa.—This table may be readily folded into small space for being more conveniently carried to the place of use, and when opened it forms a stool or bench of considerable strength. The invention consists of two hinged symmetrical bench sections, with hinged folding legs that are fitted by suitable recesses, and locked to a central stiffening piece, which is hinged to one of the bench sections.

IMPROVED BASE FOR CHAIRS AND STOOLS.

William T. Doremus, New York city.—Around the upper part of the socket which receives the pivot of the chair is cast a downwardly inclined flange. The flange has four V-shaped grooves formed in it to receive the V-shaped upper edges of the upper ends of the legs, the ends of which rest against the sides of the socket. To enable the chair to be raised from the floor without having the legs drop out, bolts are passed down through the flange and through the legs.

IMPROVED RUNNING GEAR.

George W. Gilmore, Weatherford, Tex., assignor to himself and F. M. Davis, of same place.—This is an improvement in suspension vehicles, and upon the patent granted to James Patterson, April 16, 1850. The rear axle consists of two opposite arch bars connected at each end by angular pieces, and is braced and secured to the reaches by a middle post. The front axle has a fifth wheel formed upon it in one piece. The connection of the supporting springs with the axles, and the rigid connection of both front and hind axles by a brace, produce an iron suspension frame of great strength and durability.

NEW CHEMICAL AND MISCELLANEOUS INVENTIONS.

IMPROVED MILLSTONE DRESSING MACHINE.

Albert Hoppin, La Crosse, Wis.—The use of emery wheels for dressing millstones has proved economical, and also produced a better mechanical result than the devices previously employed. But the machines hitherto devised for the purpose have been cumbersome or otherwise objectionable. The object of this invention is to furnish a machine better adapted for such work. For details, it will be necessary to refer to the patent.

IMPROVED FAUCET AND VENT.

James Talley, Jr., Kansas City, Mo.—This invention is an improvement upon a device patented to Love and Talley, Jr., June 30, 1874. The improvement relates to a rotating sleeve applied to the boring tube, and provided with openings on opposite sides, the adjustment of said tube in either of two positions rendering the device capable of acting either as a vent (for admission of air to the cask) or a faucet (for discharge of liquid from the cask). The invention likewise includes an improved corkscrew and brush tube attachment. For an illustration of this invention, see page 198 of this issue.

IMPROVED SUSPENDER AND OTHER LOOPS.

Joseph W. Bradley, New York city.—This invention consists of a re-enforcing loop of metal or other substance in combination with the loop of a suspender or other strap, commonly employed to connect the strap to a ring, buckle, or other device, the re-enforcing loop being secured by an eyelet or other suitable means. The straps with which suspenders and the like are commonly provided are subjected to rapid wear at the point where they loop over the buckle or ring, owing to friction and the deterioration of the leather by perspiration. To remedy this defect, the inventor applies metal plates and a narrow re-enforce loop to the strap loop, and thereby enhances, as he states, the value of the article without materially increasing its cost or impairing the flexibility of the strap.

IMPROVED PROCESS OF GLOSSING COFFEE.

Herman A. Kroberger, Philadelphia, Pa., assignor to H. A. Kroberger & Co., of same place.—This consists in glossing roasted coffee, while it is hot, with a primary compound of rice starch and French gelatin, and a strong solution of dextrin. The dextrin solution readily unites with the starch and gelatin compound previously put on, and forms a tenacious airtight covering with a beautiful gloss. The advantages of this process are threefold, namely, the percentage of loss in roasting is less, the evaporation of the aroma of the berry is prevented, and the appearance of the coffee is improved.

NEW HOUSEHOLD ARTICLES.

IMPROVED FLY TRAP.

David S. Kidder, Turner's Falls, Mass., assignor to himself and Frank W. Peabody, same place.—The flies alight upon a pan which is rotated by clockwork, and which is separated by partitions into three divisions. Gates are hinged to the side of the platform, from which the pan passes to cut off the escape of the flies in that direction. Said gates rise to let the partitions pass, and have vertical plates, so that they close progressively and prevent any opening at the outer part of the pan. Directly behind the gates is a covered way leading into a light chamber, through which the flies are crowded by the partitions as they advance toward the gates.

IMPROVED STOVE.

William Young Cruikshank, Shamokin, Pa.—The object of this invention is to utilize the vastly accumulating anthracite coal dust of coal mines in direct manner, without special preparation and expense, so that the same is fed in dried, heated, and well regulated state to be burned in the stove or furnace. The new features consist in a distributing cone, a drying plate, and a revolving feeder, by which the coal dust is conveyed in small and thin sheets continually to the fire below.