was put into use in Germany to decompose the fats into acids and glycerin. During the following ten years different arrangements of apparatus were patented here and in Europe, to accomplish the same purpose with water, heat, and pressure, as announced by Faraday in 1823. The earliest of these particular arrangements, patented in 1854, was by experience found impracticable, but another of somewhat later date, was extensively introduced; its peculiar feature being to keep the hot water and fat in a permanent emulsion or mixture, by a very ingenious and simple system of circulation. In strong copper vessels, hermitically closed, and kept at a temperature of 330 deg. to 370 deg. Fah., and a consequent pressure of 7 to 12 atmospheres, the decomposition of the fat is accomplished in the course of 8 to 10 hours. The mixture of fat and water is then drawn off, when it is found that the acids above float on the top, and the water holds the glycerin in solution, which then by evaporation is concentrated, and by subsequent treatment purified.

A lower temperature may be employed for this decomposition, only the operation lasts much longer; for instance at a temperature of 212 deg. or a little above, the separation is only accomplished in several days or even weeks. At the common temperature even, an imperfect decomposition of fat takes place when moisture has access. It is this which partially causes the so-called rancidity of fat; and the bleaching of common tallow candles, by exposure to air and moisture, is such a decomposition of the fat, which, however, in this case is only very superficial.

FORMATION OF ACROLEIC ACID.

At a higher temperature, for instance 500 deg. F., a destructive change takes place in the fats, the first substance formed being called acrolein and acroleic acid, which possesses the very disagreable odor of burnt fat in the highest degree.

SEPARATION OF THE FATTY ACIDS.

The three different fatty acids, the stearic, the margaric, and the oleic are mutually separated, first from the oleic by pressing in bags at the common temperature, and the margaric from the stearic by pressing it out at a temperature of 150 deg. Fah., which melts the first but leaves the last in solid condition.

As the oleic acid is a very inferior fuel, gives a poor light, and by its acidity cannot be employed for lubricating machinery, it is mostly used for soaps, and also for greasing wool in woolen factories. The stearic acid either alone, or mixed with the margaric is employed to make the so-called stearin candles, which in fact are stearic acid candles, as stearin means the combination of the acid with the base glycerin, or the stearate of glycerin.

TEST FOR FATTY ACIDS.

To distinguish candles made from these acids, or adulterated with them, from those made of pure wax, spermaceti, or paraffin, the acid reaction of the melted fat on red litinus paper is the most simple test.

The stearic acid is also soluble in alcohol, which is not the case with fat, oil, wax, spermaceti, or paraffin.

The glycerin has found numerous very useful applications, which are increasing almost daily, and form a subject for a separate article.

Quadrature of the Circle.

In former days mathematicians devoted much time and labor to the question of determining the ratio of the diameter of the circle to its circumference. Archimedes found that it was nearly as 7 to 22, and this ancient solution is still very useful for ordinary purposes. Later researches brought it at length to such a point of precision that it would be idle to seek any further, the ratio being as a unit to 3·1415926, with a continuation of 120 decimals more. It follows, then, that any attempt to make the diameter go exactly into the length of the circumference, or to represent their ratio by an exact fraction, is simply ridiculous. As such a solution, were it possible, would enable us to make a square containing the exact surface of a circle, this problem is commonly known under the name of quadrature of the circle. At last week's sitting of the Academy of Sciences, says *Galignani*, the perpetual secretary announced that a newspaper had recently revived an old story to the effect that the Academy was in possession of a considerable sum bequeathed to it as a reward for any person who might discover the quadrature of the circle. He, therefore, suggested the propriety of again publishing the decision the Academy came to in 1775, of never more devoting the slightest attention to the solutions that might be sent in of the following problems: The duplication of the cube, the trisection of the angle, perpetual motion by means of a machine, and the quadrature of the circle. It justified this course as regards the latter by remarking that many weak-minded persons, utterly ignorant of mathematics, and laboring under the impression that large sums were ready to be handed over to them in case they succeeded in solving that problem, devoted their time to it, utterly neglecting their regular business and the interest of their families, and even occasionally losing their reason by following such a vain pursuit. M. Bertrand stated that the belief in the promise of large prizes by the Academy for the solution in question had been propagated by very serious works. The "Biographie Générale," for instance, had stated that M. Rouille de Meslay had left the Academy 120,000f. for that purpose. He stated that in the eighteenth century an inventor of the quadrature actually summoned D'Alembert before the Parliament in order to recover that sum.—*London Building News.*

STEAM pressure in the boiler, and steam pressure on the engine piston, are not necessarily alike. Allowance must be made for condensation in conveyance by pipes.

MELBOURNE, Australia, completed its thirty-third year of existence on the 29th of August last. A wilderness in 1835 it is in 1868 a fine flourishing colony.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

SLEIGH BRAKE.—Milton Satterlee, Richland Center, Wis.—This invention is a neat, cheap, and easily operated adjustable brake, which can readily be attached to any sleigh or sled.

FOLDING BEDSTEAD.—C. P. Alling, Jr., Sylvan, Wis.—This invention has for its object to furnish an improved bedstead, which shall be so constructed and arranged that the bedstead may be compactly, quickly, and conveniently folded for storage and transportation, and in such a manner that the frame of the bedstead may be protected by the slat frames that form the bed bottom from injury while stored, or while being transported.

PAPER RULING MACHINE.—William C. Smith, Brooklyn, N. Y.—This invention has for its object to furnish an improved attachment for paper ruling machines, by means of which the paper, while passing beneath the pens, may be kept smooth and free from folds or wrinkles, so that the ruled lines may be uninterrupted.

ELEVATOR.—Thomas B. Simonton, New York city.—This invention has for its object to furnish an improved elevator for use in warehouses, stores, manufactories, etc., which shall be simple in construction, convenient and safe in use, and unlimited in power.

COVERS FOR CIRCULAR VESSELS.—John Kline, Rochester, N. Y.—This invention consists of a semi circular cover, the latter being affixed in a groove in the inner surface of the vessel. The movable cover, A, turns on the bolt or screw, and slides in a groove, cut or otherwise formed on the sides of the vessel.

REVOLVING CUTTER FOR PLOWS.—Marshall Sattley, Taylorsville, Ill.—This invention has for its object to furnish an improved revolving cutter for plows which shall be simple in construction, effective in operation, and not liable to get out of order.

DOOR FASTENING.—A. F. Kitchen, Shelton Depot, S.C.—This invention has for its object to furnish an improved fastening for the doors of corn cribs, and other outbuildings, which shall be so constructed and arranged as to protect the said outbuildings from the depredations of thieves.

STOVE.—Mrs. Sarah M. Clark, Beaver Dam, Wis.—This invention has for its object to improve the construction of cooking stoves, so as to make them more convenient and effective in use.

CULTIVATOR.—Theophilus Arndt, Mount Joy, Pa.—This invention has for its object to furnish an improved cultivator which shall be so constructed and arranged as to be conveniently and readily adjusted for performing the various operations necessary in cultivating corn at the various stages of its growth.

HARROW.—Moses Atwood, New Sharon, Iowa.—This invention has for its object to furnish an improved harrow, which shall be so constructed that, should the teeth become clogged, or strike an obstruction, it may be easily and quickly cleared without its being necessary to raise the harrow frame from the ground.

ROOT CUTTER.—G. S. Perfater, Camp Point, Ill.—The object of this invention is to provide an attachment for cutting small roots, vines, and stubble, in front of plows, and is designed to be attached to a plow in the manner hereafter to be set forth. It consists of a revolving cutter, working in the rear and above a fixed cutting point, and also working in a slit in the curved shank, forming part and supporting the fixed cutter, whereby the roots and vines will be first partially severed by the fixed cutter, and afterward completely severed by being drawn between the revolving cutter and the afore. said curved shank in which the latter works.

BLANKS FOR SPADING AND OTHER FORKS.—J. C. Richardson, Ilion, N. Y.—This invention consists in punching or cutting the blanks out of a plain strip of metal, in such a form that no metal is wasted, and which form facilitates the process of finishing the blank.

COMBINED HAMMER AND NAIL HOLDER.—Ransom W. Green, Bradford, Pa.—This invention consists of the arrangement on the handle, near the hammer of a fixed and a sliding clamping jaw, the latter being provided with a spring for causing it to clamp the nail, and a thumb piece for retracting it. It is connected to the handle by a bent strip of sheet metal whereon it slides back and forth, for clamping or releasing the nail.

EXHAUST GOVERNOR.—Samuel Trumbore, Easton, Pa.—This invention relates to improvements in governors for regulating the speed of engines used for exhausting gas from hydraulic mains in gas works, whereby it is designed to provide a quicker and more reliably acting governor, such as are actuated by the pressure of the gas in the said mains, for regulating the speed of the engines used for exhausting the same.

RAILROAD RAIL.—Henry Zahn, Toledo, Ohio.—The object of this invention is to provide a railroad rail combining several advantageous qualities. It consists in forming the rail in two parts, namely, a solid bar or rail proper, supported by a hollow base of triangular section, and having a longitudinal opening along its upper part into which a tongued rail fits.

HORSE POWER.—Milton Fisk, Sparta, Tenn.—This invention consists in the arrangement of a table to be moved around the vertical axis of a fixed bed by the horse, said movable table carrying a counter shaft and gearing deriving motion from a wheel secured to the fixed bed, and communicating it to a central spindle which may serve as the spindle of a set of stones on the top of the movable table, or as a shaft for conveying motion to other machinery when the upper stone is removed and another section shaft coupled thereto.

MACHINE FOR CLEANING ENTRAILS.—John A. Huss, Louisville, Ky.—This invention relates to the cleaning of animal entrails and so preparing them for the manufacture of sausages and other articles of use. It consists of two rollers revolving in contrary directions and armed with scraping edges affixed radially around the surfaces of the said rollers, together with other, devices perfecting the whole.

DEVICE FOR HOLDING DOORS OPEN.—W. W. Green, Jr., Janesville, Wis.—The object of this invention is to prevent the door or the knob of the lock from marking the wall by striking against it when the door is swung open and also to catch automatically and hold the door open. It consists of a knob bearing a forked spring catch affixed in the end of a knob affixed to the wash board or surbase of the wall, in a suitable position to enter a socket plate affixed in the bottom part of the door.

MUSKETO NETTING.—Charles B. Seaman, 'Honesdale, Pa.—The object of this invention is to provide a simple and convenient apparatus for excluding musketoes or flies from sleeping persons. It consist of a rectangular frame of wood of suitable dimensions to inclose a person, and provided with several wooden or wire bows arising therefrom, and longitudinal rods over which a musketo netting is stretched.

DOG POWER MACHINE.—A. W. Hager and J. H. S. Grove, Waverly, Iowa.—This invention relates to machines for utilizing dogs by causing them to drive light machinery, as churns, washing machines, grindstones, and the like.

TENONING MACHINE.—Wm. Gilmore, Hudson City, N. J.—This invention consists in the arrangement of a sliding clamping carriage on a table, and a pair of vertically-reciprocating cutters on a suitable frame and operated by foot power.

POUNCE HOLDER.—Robert Cushman, Pawtucket, and John R. Dennis, Central Falls, R. I.—This invention relates to a new instrument for closing the pores of paper after the same have been opened by an eraser, so that the ink may not run on such erased parts of the paper. It also consists of a handle to which a bag is fastened that contains rosin and chalk, or such other material in a powdered stare, by which the pores will be closed, the powder having the color of the paper to be smoothened.

PLANT PROTECTOR.—Dr. J. M. Hurt, Blacks and Whites P. O., Va.—This invention consists of a hollow cylinder made of any suitable material and size, with a glass top near one end, and perforated for a suitable proportionate part of its length from the end having the glass cover which is to be set over the plant for the purpose of protecting it. Patented Oct. 27, 1868.

SPUR FOR ICE AND OTHER PURPOSER.—C. F. Wieland, Darmstadt, Ill.—The object of this invention is to provide a simple, convenient, and effective spur or creeper, so-called, for walking on ice or inclined roofs of houses. It consists, in general terms, of two U-shaped metal plates; one constituting the heel plate, and the other which is pivoted to it in such a manner as to fold back on the heel or forward under the sole of the shoe, gears pointed studs which enter the surface walked on, and thereby prevent the wearer from slipping. A coiled spring is arranged on one of the hinge pintles of the movable part and is enclosed within a case affixed to the heel plate. This spring keeps the movable part upon the heel when not wanted for use, and a spring catch device retains the movable part under the sole of the foot when in use as a creeper.

ADJUSTABLE HOLDBACK AND EXTENSION POLE FOR WAGONS, SLEIGHS, ETC.—W. W. Rexford, Loch Sheldrake, N. Y.—The object of this invention is to so arrange the holdback on a carriage pole that it can be moved backward and forward on the pole, so as to be adjusted to different kinds of harness and to horses of various sizes. It further consists in attaching the holdback projection or ear to a tube which slides on the front end of the carriage pole, and which can be locked to the pole in any desired position by a suitable spring catch. The invention also consists in fitting around the front end of the pole, and in securely fastening the same, a metal tube which has a groove or feather corresponding to a feather or groove on the holdback tube, and which has perforations to receive the aforesaid spring catch.

BOTTLE-FILLING MACHINE.—Peter M. Sherwood, New York city.—This invention relates to improvements made in a bottle filler, for which Letters Patent were issued to Theodore Cochen, dated June 5, 1866.

SAW COTTON GIN.—William Sutton, Washington, Ga.—This invention relates to a new and useful improvement in the construction of hoppers for saw cotton gins, and also in a new and improved construction or arrangement of the breast through which the saws work, whereby several advantages are obtained over the ordinary saw cotton gin in use.

LEVER WATCH MOVEMENTS.—William Borthwick Smith, Coventry, England.—This invention consists in an improved construction of lever watch movement or frame, with the application thereto of a T-lever escapement (detached or otherwise) working in a straight line or at a slight divergent angle, and having the same action as in the ordinary construction.

STONE PRESS.—James W. Gaines, Clarksville, Texas.—This invention relates to a new and improved press for mill stones, whereby the grain is better distributed than usual in passing between the stones, the grain more thoroughly ground and a larger product of flour obtained from a given quantity of grain.

SEED SOWER.—Gottfried Rank, Greenleaf, Minn.—This invention relates to a new and improved machine for sowing seed broadcast, and it consists in a means for scattering the seed and protecting the same from the action of the wind while being sown or scattered upon the ground.

COMBINED CRUSHER, HARROW, AND ROLLER.—John Simpson, Charleston, Ill.—This invention relates to a new and improved device for crushing, harrowing, and rolling the soil for the purpose of rendering the same light and pliable to favor the growth of crops.

WATER WHEEL.—S. J. Thomas, Dawson, Ga.—This invention relates to a new and useful improvement in the buckets of water wheels and it consists in the constructing and arranging the buckets in such a manner that the best possible effect is obtained from the reactive force of the water.

WATER WHEEL.—Wm. E. Tate, Cambridgeport, Mass.—This invention relates to a new and improved water wheel which is also applicable for measuring water or may be used as a water meter.

FOLDING CHAIR.—Adam Collignon, Closter, N. J.—This invention relates to chairs that are made to fold up whereby, they are rendered much more convenient for storage and transportation than chairs of ordinary construction.

HOT AIR FURNACE.—S. J. Hare, Louisville, Ky.—This invention relates to improvements in furnaces for heating air for warming buildings and consists in the arrangement of drum and air passages in combination with the air box and combustion chamber.

VARIABLE CUT-OFF.—Thomas Hansbrow, Sacramento, Cal.—This invention relates to a new and improved method of controlling the speed and action of steam engines, whereby the quantity of steam supplied to the cylinder is proportioned to the work.

APPARATUS FOR OPENING AND CLOSING HATCHES.—James D. Sinclair Brooklyn, N. Y.—The object of this invention is to produce an apparatus by means of which any one or all of the hatches in a magazine, storehouse, or other building can be conveniently opened or closed by a person standing on one of the floors, so that it will not be necessary for such person to go for that purpose to each and every floor.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

J. C. R., of ——The glass used in an aquarium can be advantageously cemented to the frame by good putty made of white lead and linseed oil. Before putting in the fish, etc., water should be allowed to stand in it, and be changed until no taste or smell is imparted to it.

C. H. D., of N. Y.—The phrase, "The cup that cheers and not inebriates," is perfectly grammatical. The placing of the negative adverb before the verb, inebriates, without the auxilliary *does*, is not perhaps in exact accordance with our English idiom but does not by any means exceed the license accorded to poetical writers.

W. C. W., of Mich.—Registers for admitting hot air should always be placed at the bottom of the room intended to be heated by them —Ventillating registers should be placed near the ceiling.

C. G. C., of Pa.—The later Polar Expeditions have attempted to follow the Gulf Stream, in the hopes of thereby attaining a higher latitude than would otherwise be possible, but they have not reached the open Polar sea.

A. L. of Mass.—The curative or medicinal properties in petroleum (sold under various names) is owing to its carbonaceous properties. It is a hydro-darbon. The carbon contained in cod liver oil constitutes also its medicinal value.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

SPINNING COTTON AND OTHER FIBROUS SUBSTANCES.—John Whitin, Whitinsville, Mass. Oct. 7, 1868.

3,070.—WATCHES, CLOCKS, AND OTHER TIME PIECES.—Henry Josephi, New York city. Oct. 8, 1868.

3,091.—BINNACLE FOR IRON SHIPS.—Charles Ole Olsen, New York city. Oct. 8, 1868.

3,151.—APPARATUS FOR GENERATING ATD BURNING THE VAPOR OF HYDROCARBON LIQUIDS.—David Lowe, Boston, Mass. Oct. 14 1868.

3,155.—ELASTIC MOLD.—Thomas Taylor, Edmund P. Rogers, and Miers Coryell New York city. Oct. 15, 1868.

3,165.—BREECH-LOADING FIREARM.—Valentine Fogerty, Boston, Mass. Oct. 15, 1868.

3,196.—CARRIAGES FOR ORDNANCE.—Geo. R. Wilson, Washington, D. C. Oct. 19, 1868.

3,131.—REVOLVING AND REPEATING FIRE-ARMS.—F. A. Le Mat, New Orleans, La. Oct. 13, 1868.

3,171.—MANUFACTURE OF SIRUP AND SUGAR.—N. Pigeon, Brooklyn, N. Y. Oct. 16, 1828.

3,189.—SCISSORS.—Sarah H. Brisbane, Fordham, N. Y. Oct. 19, 1868.

3,227.—CARRIAGE WHEEL.—Walter K. Foster, Mass. Oct. 21, 1868.

3,233.—MACHINERY FOR PROPELLING WATER CRAFT.—Edwin S. Renwick, New York city. Oct. 22, 1868.