times a large tub is filled at one dredging with all sorts of living specimens—shells, corals, shrimps, barnacles, sea-urchins, star-fishes, sponges, polyps, and sea-weeds, with all their natural brilliancy of tints."

A water glass is also used which "is nothing more than a square wooden tube, with a glass plate in the lower end. Sinking this under the water and looking through it, all the undulations of the surface, which distort objects below, are lost, and nothing obstructs the vision.

"Seen through this simple apparatus, the sea-bottom, or rather the summit of the reef above which we were floating, was like the most exquisite aquarium, the contents of which were ever shifting."

London Bridge having become too narrow to accommodate the traffic over it, it is now proposed to widen it by throwing the foot-walks into the carriage-road, forming new footways upon cantilevers and brackets on either side of the road. This will increase the width of the carriage-way from thirty-five to fifty-three feet.

Inventions Patented in England by Americans.

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

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,465.—Manufacture of Boots and Shoes, and in Machinery or Apparatus Employed Therein.—N. A. Baldwin, Milford, Conn. August 25, 1869.

2,640.—Spinning Mules.—Samuel Oddy, Manchester, England, Robert Nuttall, Bury, England, and John B. Smith, Wappinger Falls, N. Y. Sept. 8, 1869.

2,664.—Fire Extinguisher.—G. F. Pinkham, Cambridge, Mass. Sept 11, 1869.

2,745.—Spindles and Flyers of Spinning Frames.—J. Goulding, Worcester, Mass. September 21, 1869.

NEW PUBLICA IONS.

An Essay Upon Force in Nature and its Effects Upon Matter. Cincinnati: Robert Clarke & Co., Publishers.

The theory of Newton that every particle of matter attracts all other particles of matter in right lines joining their centers, and in an inverse ratio to the squares of their distances by virtue of an inherent force called gravity, accounted for the motions of the planets so satisfactorily that it has been almost universally adopted by subsequent physicists as a natural law. Nevertheless there have not been wanting those who have doubted the correctness of this theory. Among these Faraday has been perhaps the most conspicuous. Without doubting the fact that what we call gravity varies as the squares of the distances, he claimed that the supposition that *a single force* could so vary was in conflict with the highest law in physical science capable of comprehension by the human mind, namely, the conservation of force.

The pamphlet before us is a very modest and calm statement of a doubt in regard to the truth of this celebrated and generally accepted theory, and though metaphysical, as all discussion upon an abstract notion of force must be, calls in mathematics to aid in the elucidation of a new theory which is, that "that all planetary movements are caused by the effect of force on matter—not inherent in matter; and further, that the one primal force on which planetary movement depends, modified by special effects upon substances differing in kind, in arrangement, and in position, is that which, under the modified conditions, is called by the various names of force, as of attraction and repulsion, cold and heat, electricity, magnetism, weight," etc. The latter portions of the essay, in which it is attempted to sustain the theory, are, as the author claims, merely suggestive; the first part being devoted to the attempt to demonstrate mathematically that the theory of Newton is untenable.

We are disposed to be lenient with the errors of an author who expresses his views so temperately and candidly as this, and though it would not be difficult to show some defects that, in our opinion, vitiate the whole argument, we do not think the topic of sufficient value to enter upon its discussion. Indeed the author himself asserts that he claims no scientific value for the discussion or the idea which led to it. We must therefore place this book among those works of which the world has seen too many; works seemingly written to no purpose but to indulge the love for speculation which has been a characteristic of certain minds in all ages.

The Gold Fields and Mineral Districts of Victoria With Notes on the Modes of Occurrence of Gold and other Metals and Minerals. By R. Brough Smyth, F.G.S., Secretary for Mines for the Colony of Victoria. Melbourne: Printed and published by John Ferres, Government Printer. H. T. Dwight, 252 Bourke street, East. London: Trubner & Co., Paternoster Row.

This is a compilation in large quarto form, of an immense mass of information, historical, statistical, and technical, relating to the mineral resources of the Colony of Victoria in Australia. The perusal of the volume will, without doubt, excite surprise even in the minds of many Englishmen accustomed to regard Australia as a sort of *El Dorado*, yet having only a vague and very imperfect idea of the immense resources of that continent. Even many Anglo-Australians have only a partial knowledge of the country they inhabit, a country destined, perhaps, at some future period, to play as prominent a part in the history of the world as Great Britain itself. It would be futile to attempt a review of this work in any space we can at present allot to it. Suffice it to say, that we deem it one of the most important works of its class ever published. As a work of reference it will prove of great value, as it is thoroughly indexed, and also contains a glossary of mining terms, with plates illustrating scenery, also apparatus, implements, etc., used in the Australian mines. The entire work is, moreover, illustrated in a very artistic manner. The reader will find in another column an extract from this work, with an illustration of the "Welcome Stranger Nugget," found near Donolly in Australia, the largest mass of pure gold ever found native in the history of gold mining.

The Progress and Condition of Several Departments of Industrial Chemistry. By J. Lawrence Smith, U. S. Commissioner to the Paris Universal Exposition, 1867.

This is one of the series of able and instructive reports which have been prepared and published on the great French Exposition. We have met with no similar document of greater interest and value than this, and we find in its perusal that we shall be able to select many extracts of interest which we shall in due time lay before our readers, premising that some of the deductions of the author in regard to the effect of legislation upon similar industries in the United States do not receive our sanction. An extract from this report, entitled "Applications and Progress of the Manufacture of Sulphuric Acid," will be found in another column, and is the first of several extracts we shall make upon this, and other important branches of manufacture.

Useful Information for Railroad Men. Compiled for the Ramapo Wheel and Foundery Company by W. G. Hamilton, Engineer. Second Edition. Revised and Enlarged. New York: D. Van Nostrand, Publisher, 23 Murray street, and 27 Warren street.

This is a hand, or rather a pocket book of information in a condensed form, mainly compiled from the standard works of Clark, Colburn, Bourne, Haswell, Hurst, Molesworth, Nystrom, Percy, Scribner, Templeton, Ure, Price, and Williams, and is filled with useful and practical formulæ, rules, statistics, recipes, tables, etc., etc., thoroughly indexed, and provided with a rubber clasp. One of those books of reference most useful to practical men, and published in admirable style.

Railway Economy. Use of Counter-Pressure Steam in the Locomotive Engine as a Brake. By M. Le Chatelier, *Ingenieur en Chief Des Mines*. Translated from the Authors' Manuscript. By Lewis D. B. Gordon, F.R.S.E., Honorary Member of the Institution of Engineers in Scotland. Philadelphia: J. B. Lippincott & Co.

There is nothing new in the general idea of steam counter-pressure brakes. As practiced previous to the investigations and inventions of M. Le Chatelier, there were, however, insuperable objections to the employment of the system. These objections are fully set forth in the little work before us, as well as the progress of the experiments by which such an important modification of the system has been made, that, at the present date, upward of two thousand engines are running in France and Spain with this improvement attached, and it is also being introduced on the German railways. We have now in process of preparation an engraving of this improvement, and will give, in a future number, all necessary explanatory details in regard to it.

We are in receipt of the first number of a neatly-printed quarto sheet called The Polytechnic, a semi-monthly of twelve pages, Montague L. Marks, editor and proprietor, 208 and 210 River street, Troy, N. Y. The prospectus informs us that the design is to establish this paper permanently as a high-class college scientific publication, to be increased both as to quantity and quality of its contents according to the amount of patronage it may receive. The connection of this paper with the Rensselaer Polytechnic Institute gives it command of many resources, both from the talent always to be found in that excellent school and from the alumini, among whom are many of our best engineers and scientific men. The first number is spirited and its contents are interesting. We wish our new co-temporary the success it merits. Subscription price $1 per annum.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

A valuable discovery of bismuth ore has been made near Balhannah, South Australia.

An alloy for jewelers' use, said to be very ductile and malleable and to possess a fine color, is composed of 750 parts of gold, 166 parts of silver, and 84 parts of copper.

During last year the quantity of silkworms' eggs exported from Japan amounted to 2,195,651 cards. Of this number 800,000 have been sent to France, Spain, Turkey, Persia, and other countries, and the remainder to Italy.

Dr. Poselger has determined by positive experiments that the death of trees growing along streets and promenades is not due, as has been often asserted, to the effects of the leakage in gas mains; but that it is owing chiefly to the neglect of so keeping the soil that air may freely permeate to the roots.

Abundant seams of coal of good quality have been discovered on the eastern shores of the Caspian Sea. Humboldt was of opinion that coal would be found there at no great depth, since the entire district abounds in naphtha. The steamships of that sea have hiterto employed wood as fuel, which had to be conveyed, at great cost, from the Ural mountains.

A number of submarine sweet water springs are known to exist in the Adriatic, along the coast of Istria and Dalmatia. As the maritime districts of these provinces suffer from want of a sufficient supply of water, and as it is possible by means of the Norton pump to save much that is now lost; the Austrian Minister of Agriculture has published a book on the means of finding and utilizing submarine fresh water springs on the Austrian coasts.

The Pacific railroads are now carrying emigrants to California for $70 from Philadelphia or $42 from Omaha. The number of emigrants since the 1st of September has averaged 100 per day. They are carried on the express freight train, and make the trip in less than ten days. A large increase of business is expected on this train next year.

Sir David Brewster found, says the *Engineer*, that the fundamental principle of the stereoscope was known to Euclid, who compiled the well known *Elements* about B. C. 280; that it was distinctly described by Galen, 1,500 years ago; and that Baptista Porta, in 1599, gave such a complete separate picture seen by each eye, and of the combined picture placed between them, in which we recognize not only the principle but the construction of the stereoscope.

M. Armand contributes a paper to the *Comptes Rendus* wherein he states that the deleterious effects of tobacco might be counteracted, if not entirely annihilated, by moistening the tobacco, while undergoing the various preparations and fermentations previous to its delivery to the consumer, with a strong infusion or other preparation of water-cresses. He has discovered that this vegetable contains principles which, while the peculiar aroma of tobacco will remain unaffected, will destroy the bad effects of nicotine.

The most remarkable railroad in Germany and Europe is the new Black Forest road, which will be completed within four years. Between Hornberg and St. George, situated 2,870 feet above the level of the sea, and but four miles distant from Hornberg, the railroad ascends nearly 2,000 feet, and passes through 27,000 feet of tunnels. Eleven thousand feet of the latter have been completed during the last two years. The truly Cyclopean work on the road is progressing rapidly, and attracting thousands of visitors, who flock together from all parts of Southern Germany and Switzerland.

Recent American and Foreign Patents.

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

Harrow.—P. S. Graves and P. B. Parcell, Ashmore, Ill.—This invention relates to a new and useful improvement in harrows, and consists in arranging the teeth in the harrow frame so that they may be simultaneously thrown backward or forward on either side.

Apparatus for Raising Water.—Jas. W. Prendergast, New York city.—This invention relates to a new and useful method of raising water by atmospheric pressure.

Soldering Machine.—John G. Borden, Brewster Station, N. Y.—This invention relates to new and useful improvements in a machine for soldering tin cans and other articles of tin ware.

Steering Apparatus.—George H. Davis, Stony Brook, N. Y.—This invention relates to a new and useful improvement in apparatus for steering vessels on the water, and consists in constructing and arranging a chain pulley in such a manner that a chain may be effectively used in combination with a traversing wheel.

Car Coupling.—William Cottrell, Bordentown, N. J.—This invention relates to new and useful improvements in couplings for uniting railroad cars together; and it consists in a device for holding the coupling link in a horizontal position when the cars are being coupled, and in the method of inserting the coupling pin.

Railroad Supply Apparatus.—David Harrison, Fayette, Miss.—This invention has for its object to furnish a simple, convenient, and effective means for supplying a moving railroad train with water, fuel, etc., while under full headway.

Fence.—Smith Riley, Kenton, Ohio.—This invention consists of sections made of longitudinal bars with beveled ends and vertical pickets, the said beveled ends of the sections being joined so as to assume a zig-zag form, and held together by connecting links extending from the picket with the end of one section to the corresponding picket of the next section.

Tile Machine.—George Jackson, Albany, N. Y.—This invention relates to certain improvements in tile machines, of that class in which the clay is by a sliding piston forced through apertures in the end of a box, so that it comes out in a continuous stream of the requisite cross section, to be cut into pieces of the desired length by a series of wires attached to a swinging frame.

Sickle-Bar Coupling for Mowers and Reapers.—Rufus C. Wood, Le Roy, Kansas.—This invention has for its object to furnish an improved coupling for connecting the pitman and sickle bar of a reaper or mower to diminish the wear of the coupling pin and eye, and prevent the "end shake" of the sickle bar, and which shall at the same time be simple in construction and easily attached.

Cloth-Thinning Machine.—J. W. Burch, Fayette, Miss.—This invention comprises an arrangement of devices for operating either a rotary cutter of three or any other preferred number of curved blades projecting from a disk, revolving transversely of the row, or a vibratory cutter working back and forth above the row, the whole mounted on a suitable frame and wheels, and deriving motion from the axle of the said wheels by suitabe gearing.

Press.—John Berkley, Washington, Texas.—This invention relates t improvements in presses for cotton, hay, and similar substances designed to provide a portable press of simple and cheap construction, mounted on wheels, for moving it from place to place, and arranged for adjusting the case in a vertical position for filling, and in a horizontal position for pressing, the follower being also arranged to work in a horizontal position.

Churn Dasher.—Gustav Radbruch, Hoboken, N. J.—This invention relates to a new churn, of that class known as atmospheric churns, and consists of a new dasher, so constructed that it will at once agitate the cream and supply the necessary air by simple means.

Ruffling Attachment to Sewing Machines.—Louis H. Gunnerman Pittsburgh, Pa.—This invention relates to a new apparatus for ruffling or wrinkling fabric, and for attaching the same to straight fabric; and the invention consists in the arrangement and combination of two plates, by which the two fabrics will be properly gaged and separated before they are sewed together.

Chair.—Allen Lapham, Paterson, N. J.—This invention has for its object to improve the construction of chairs, so as to make them stronger, more durable, and less liable to become loose and shaky than when constructed in the ordinary manner.

Gang Plows.—H. N. Dalton, Pacheco, Cal.—This invention has for its object to improve the construction of gang plows, in such a way that the gang plow may be raised while running to cut a light furrow, or to lift it entirely from the ground at the will of the operator, and which shall be simple in construction and readily applied and operated.

Kerosene Lamp Burners.—Edward L. Gilman, Somerville, Mass.—This invention has for its object to improve the construction of kerosene lamp burners, so that the gas arising from the oil or fluid mingled with air may be conducted to the flame to increase the light.

Portable Fire Escape.—Hugh C. Carrigan, New York city.—This invention has for its object to furnish an improved portable fire escape, designed to be kept by those occupying upper apartments, in their rooms; and which shall be so constructed and arranged, that it will enable the occupants of the rooms to lower their property and themselves with speed and convenience to the ground, and which, when not in use, will present the appearance of being nothing but an ordinary chair and may be used as such.

Water Regulator, Alarm, and Indicator for Steam Boilers.—Leopold Steigert, Cincinnati, Ohio.—This invention consists of the arrangement of a float in a vessel, attached to the side of the boiler in a manner to oscillate a shaft carrying indicators and actuating a whistle valve, and a plug in the supply pipe whereby the whistle may be caused to blow at the proper time, and the water is allowed to flow to the pump where required, or shut off when not needed.

Hay Loader.—J. C. Leonard, S. B. Holcomb, and W. B. Wight, Clinton, Mo.—This invention consists in a rake and elevating apparatus, mounted on two wheel to be hitched to the rear end of the wagon and arranged to gather the hay in front of the fixed curved teeth of the rake, from which it is taken by the elevator and delivered to the wagon in a peculiar manner.

Water Regulator and Alarm.—James William Ebert and Eli C. McCloy, Zanesville, Ohio.—This invention comprises an arrangement of valves in the feed water supply pipe for the pump, connected with a float and bung inside the boiler, so as to open and close the passage, as required; also, in connection with the said valves, another set of valves in the steam pipe leading to the whistle, which, when the water supply fails will give the alarm.

Velocipede.—Theodore Searing, New York city.—This invention consists, first, in a peculiar arrangement of runner and brake attachment for the wheels, and second, in an attachment to the propelling cranks of a pair of vibrators, to which are attached spiked segmental bars by pivot joints, under an arrangement whereby the spikes will be caused to engage with the ground when moved in the direction for propelling, but will slip over it without engaging when moving in the opposite direction.

Flying Machine.—W. F. Quinby, Wilmington, Del.—This invention relates to improvements in flying apparatus intended to provide an arrangement of temporary sails, resembling in some respects the wings of birds in their construction and operation, which may be readily connected to the body of a person by means of a cuirass fitted to the body and made of metallic strips, formed and adapted to assist the operator to support the wings and at the same time to shield him from the shocks and jars due to the operation of the wings.

Governor for Steam and other Engines.—W. J. Kesselmeyer, C. A. Kesselmeyer, Manchester, England, and E. H. Nacke, Als-Shoenfeld, Saxony.—This invention has for its object to render centrifugal governors more perfect in regulating the speed of the engine, so that the speed will be immediately corrected, as soon as it shall vary. The invention consists in the application to the movable valve rod of a vessel containing liquid matter, and in connecting the same with a stationary vessel in such a manner that, when by the contraction of the governor balls, the movable vessel is lowered, the liquid will flow into it from the reservoir, causing it to sink and to open the valve without loss of time.

Water Velocipede.—F. A. Spofford and M. G. Raffington, Columbus, Ohio.—This invention relates to a new mechanism for propelling water craft by muscular power and by the aid of levers, ratchet wheels, etc., applied to paddle wheels.

Chocolate Paste.—L. F. Leger, New York city.—The object of this invention is to so prepare chocolate that it can be preserved in a semi-liquid state, to be readily dissolved when required.

Iron Double Shovel Plow.—C. I. Voigt, West Salem, Ill.—This invention has for its object to furnish an improved double shovel iron plow or cultivator, which shall be simple in construction, easily adjusted, effective in operation, and easily operated.

Manufacturing and Refining Sugar.—Louis J. F. Margueritte, Paris, France.—This invention consists in manufacturing and refining sugar by the following mode of operation: The sugar mixed with molasses is first brought in contact with a certain quantity of wood spirit in a mixer, where the whole is stirred for a very short time. The mixture consisting of sugar and liquid is then passed to a filter similar to those containing animal charcoal, when the black liquor of the molasses is run off, which is afterward replaced by pure wood spirit. A washing effected in this manner by displacement furnishes a perfectly white sugar.

Hay Raker and Loader.—N. Farlow and J. A. Ham, Sullivan, Ill.—This invention relates to improvements in apparatus for raking hay and elevating it to a pitching platform, all suspended from a pair of wheels to be hitched to and drawn by the wagon to be loaded, or, when used for gathering grain for binding, to be drawn by a horse; the invention consisting in certain arrangements of the parts.

Hay Derrick.—Winfield Denton, Iowa City, Iowa.—This invention relates to a new and useful improvement in derricks for loading hay.

Car Coupling.—Michael Connelly, Baltimore, Md.—The object of this invention is to provide for public use a simple and effective automatic coupling for railroad cars.

MACHINE FOR SAWING KINDLING WOOD.—W. A. Allen, Baltimore, Md.—This invention relates to that class of sawing machines in which several circular saws are employed, in connection with endless chains and knees, for carrying the logs.

CIDER PRESS.—John J. Shaffer and Emanuel Stoner, Westminster, Md.—This invention relates to a press, in which the follower slides up and down upon vertical rods, passing through it, one near each of its ends.

FARM GATE.—Daniel Shockey, Waynesborough, Pa.—The object of this invention is to provide for public use a neat, light, simple, and strong gate, for use upon farms, etc., and which can be conveniently opened or closed from either side.

FIRE GRATE.—Asa Snyder, Richmond, Va.—This invention consists of a basket grate and concave perforated radiator, placed in such relation to the chimney and jambs as to leave an air space between the grate and the chimney and jambs, said air-space being, in fact, a continuation downward of the smoke flue of the chimney, and being seperated from such smoke flue by a damper placed between the radiator and the chimney for the purpose of creating a rapid draft through the air-space, and carrying off the debris dislodged by raking the fire.

"FIXING" OR REPAIRING PUDLING FURNACES.—Morgan Z. Evans, Ormsby Post office, Pa.—This invention relates to puddling and boiling furnaces, and applies in the process called by furnacemen "fixing," which is performed as occasion may require, in the way of repairs.

REAPING AND MOWING MACHINES.—T. H. Taylor, Jeffersonville, Ill.—This invention relates to improvements in reaping and mowing machines designed to provide an improved arrangement for operating the cutter bars; also, an improved arrangement of the cutter and cutter supporting bars.

KNIFE GUARD.—E. A. Goodes, Philadelphia, Pa.—The invention consists of a wire-guard attachment, so shaped and arranged relatively to the knife blade, that it may be readily clamped to the blade by thumb nuts, screwing on to the ends of the wire and against the back edge of the blade, with the gaging part adjusted along the edge, at one side, parallel with it, and the required distance for the thickness of the paring from it.

HORSE-POWER.—Diffendall & Hughes, Westminster, Md.—The object of this invention is to provide a simple and compact arrangement of multiplying wheels in a portable horse-power, for producing a rapid motion for the tumbling shaft, from the first mover, with the least possible amount of lateral pressure on the driving shaft.

LIFE, SURF, AND OTHER BOATS.—Henry Thompson, Mobile, Ala.—The object of this invention is to provide new and useful improvements in small boats, to render them safe and efficient as life, surf, or pleasure boats. Also, to provide improvements in propelling apparatus, calculated to apply the same to better advantage than in the common way. Also, to provide an an arrangement of the paddlewheels and wheel guards, to facilitate the transportation of the said boats on land. Also, to provide an arrangement of pumping devices, which may be used either for pumping water from the hold, or for drawing water over the side, for playing upon fires, or for other purposes.

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; beside, as sometimes happens, we may prefer to address correspondents 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 advertisemets at $1·00 a line, under the head of "Business and Personal."

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

A. H. B., of Pa.—A body floating in a fluid medium, and sustaining by its buoyancy just as much weight as it is capable of supporting, would descend through that medium by the addition of just sufficient weight to overcome the friction of the fluid against its sides. It will then certainly take *as much* (practically more) weight to draw it down through that fluid as it can raise by its buoyancy. In the answer to the correspondent about the balloon, the endeavor was to make this point clear, and to show that a balloon in rising could exert no more force (practically not so much) than would be required to pull it down again.

W. A. H., of Tenn.—The plan of closing a well air tight at its mouth and inserting a pipe to reach below the surface of the contained water, and raising the water by forcing air into the well will work in some cases, but it is neither new, patentable, nor practicable. Because the top of a wheel rolling along a level surface moves faster ahead relatively to any point on that surface than the bottom, it does not follow that its circumferential motion is greater at the top than at the bottom. What we mean by circumferential motion, is the motion of all points in the circumference around the axis of the wheel.

J. A., of Ill.—The photographer has the best of it. The contraction of the pupil of the eye does not diminish the apparent size of external objects. The reason of the apparently larger size of the sun and moon when near the horizon is probably that they are then in immediate contrast with terrestrial objects, by which their size is estimated, while in the zenith no such standard of comparison can be simultaneously viewed with them.

B. J. J., of Va.—We would not recommend the arrangement of piping for a lumber drying-house you propose. "A Practical Treatise on Heat," published by Henry Carey Baird, of Philadelphia, will instruct you properly on this subject. There ought to be good ventilation in any room used for drying purposes. Your last question cannot be answered in the form you put it.

J. B. W., of Pa.—Your suggestions for ventilating mines by forcing air down through a main pipe by steam power, and delivering it through branch pipes, contain nothing new. This is, however, a good plan, and it, or its equivalent, has been tried successfully in English coal mines. We agree with you that either this or some other equally effective system ought to be generally adopted in working coal mines.

J. W. P., of Me.—The best material for a step to a turbine wheel is probably lignum vitæ. That your steps burn out indicates that the wheel is not balanced properly to take off its weight from the step. If it is not practicable to balance it in this way your only remedy will be to increase the size of the bearing in proportion to the weight of the wheel.

G. M. S., of Miss.—The power of an engine having a twenty-inch stroke would be to one having a thirty-inch stroke, everything else being equal and the steam being worked non-expansively, as one to two. This, of course, supposes everything so arranged that the mean effective pressure in the cylinders should be the same throughout their respective strokes.

F. C. B., of Ohio.—To scale sheet steel, use a wooden trough lined with sheet lead. Use crude sulphuric acid, one part of acid to ten of water, by measure, or rather more dilute, let the sheets remain only a very short time in the bath, take them out and wash them in hot lime water, and then rub them with clean dry saw dust or chaff.

W. Z., of La.—The appearance of gold, copper, or brass, is given to tin plate by the application of suitable lackers. You can purchase these lackers at dealers in varnishes, etc.

F. D. H., of N. Y.—You can dissolve rubber in naphtha to a thick solution and with it stop small holes in rubber. Apply it soft and allow it to harden thoroughly.

G. G. B., of N. H.—The mineral specimen seems a schist containing iron. It appears to be of no value, but analysis might give a different result.

J. D. P., of N. Y.—The broad gage railways are failures only because they are, for various reasons, so expensive in their operation. We can not enter at this time into a detailed account of these causes, They are good for the passengers but hard on the companies who own them.

M. G., of Minn.—Your sketch is very imperfect, but from what we can understand of it, it shows no patentable improvement. It would, therefore, be scarcely worth while to enter into the computation necessary to determine what strain such a structure would sustain.

S. E. W., of N. Y.—Friction would be reduced in using friction rollers under your shaft in proportion to the diminished surfaces of the journals. The size must depend upon the circumstances of the case. Make the rollers as large as you can conveniently.

C. T. G., of Pa.—It would be impossible to give you the knowledge you require in the form of a recipe. A small volume called "The Complete Practical Brewer," published by Henry Carey Baird, of Philadelphia, gives the precise information you require.

J. M. H., of Wis.—We know of no steam apparatus which will meet your requirements and which you can purchase ready made You might, it seems to us, easily devise one for yourself. Set your wits t work.

R. S. B., of Ky.—The minerals you send appear to contain iron and perhaps copper, with sulphur and arsenic. We cannot determine whether other metals of value are present without making an assay.

M. S. M., of Mo.—The stones you send are agate and chalcedony. They have little value except when worked and polished. They are rendered valuable according to the labor bestowed upon them.

E. H. S., of N. H.—You will find an article fully treating your question about long and short screw drivers in the SCIENTIFIC AMERICAN, Vol. XVIII, No, 25, page 393, June 20, 1868.

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per line will be charged.

Official List of Patents.

Issued by the United States Patent Office.

FOR THE WEEK ENDING OCT. 5, 1869.

Reported Officially for the Scientific American

SCHEDULE OF PATENT OFFICE FEES:

On each caveat	$10
On filing each application for a Patent (seventeen years)	$15
On issuing each original Patent	$20
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In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

For copy of Claim of any Patent issued within 30 years $1
A sketch from the model or drawing, relating to such portion of a machine as the Claim covers, from $1
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The full Specification of any patent issued since Nov. 20, 1866, at which time the Patent Office commenced printing them ..... $1·25
Official Copies of Drawings of any patent issued since 1836, we can supply at a reasonable cost, the price depending upon the amount of labor involved and the number of views.
Full information, as to price of drawings, in each case, may be had by addressing
MUNN & CO.,
Patent Solicitors, No. 37 Park Row, New York.

95,405.—COMPOSITION FOR MAKING TYPES FOR PRINTING WALL PAPER, OILCLOTH, AND OTHER FABRICS.—R. A. Adams, New York city.
95,406.—SAWING MACHINE.—W. A. Allen, Baltimore, Md.
95,407.—MEDICAL COMPOUND OR CORDIAL.—Joseph Ambrose, Nashville, Tenn.
95,408.—HAY LOADER.—Isaac Anderson, Poland, Ohio.
95,409.—BINDING GUIDE FOR SEWING MACHINE.—E. F. Angell, Chicago, Ill.
95,410.—HAMES FASTENER.—H. W. Austin and E. C. Perry, Portage township; Edwin C. Perry, assignor to G. T. Nash, Kalamazoo Mich.
95,411.—COTTON PRESS.—Augustine Baldwin, New York city. Antedated Sept. 22, 1869.
95,412.—APPARATUS FOR CARBURETING AIR AND GAS.—Arthur Barbarin, New Orleans, La.
95,413.—DEVICE FOR STEAMING ROVINGS.—Solomon Barber, South Coventry, Conn.
95,414.—BAND CUTTER.—W. C. Barr and E. J. Hunkins, Macon City, Mo.; said Hunkins assignor to said Barr for his right. Antedated Sept. 22, 1869.
95,415.—WASHING MACHINE.—B. B. Beers and Nathan Couch, New Fairfield, Conn.
95,416.—HAY AND COTTON PRESS.—John Berkeley, Washington, Texas.
95,417.—SHAFT COUPLING FOR CARRIAGES.—Albert Betteley, Boston, Mass.
95,418.—MACHINE FOR SOLDERING TIN CANS.—J. G. Borden, Brewster Station, N. Y.
95,419.—PURIFYING IRON AND STEEL, OR OTHER METAL.—Edward Brady, Philadelphia, Pa.
95,420.—RIM PRESS AND TIRE HEATER.—J. H. Britton, Painesville, Ohio.
95,421.—TABLE SLIDE.—Aaron Brower (assignor to himself and C. S. Hall), Rochester, N. Y. Antedated Sept. 18, 1869.
95,422.—COTTON-THINNING MACHINE.—I. W. Burch, Fayette Miss.
95,423.—THRASHING MACHINE.—Duncan Campbell, Indian Town, Ill.
95,424.—SAFETY PIN FOR SECURING CLOTHING.—Frederick Catlin, New York city.
95,425.—DYERS' VAT.—H. Champenois, New York city.
95,426.—ATTACHMENT FOR WINDOW SASH CORDS.—S. N. Chapin, New Britain, Conn.
95,427.—STUMP EXTRACTOR.—Daniel S. Chapman, Conneaut, Ohio.
95,428.—REFRIGERATOR.—A. J. Chase (assignor to B. F. Horn), Boston, Mass.
95,429.—COOKING STOVE.—B. F. Clement (assignor to C. H. Buck and W. S. Wright), St. Louis, Mo.
95,430.—HAMES FASTENER.—J. Clendening, Rockford, Ill.
95,431.—RAILWAY CAR COUPLING.—Michael Connelly (assignor to himself and H. W. Rogers), Baltimore, Md.
95,432.—HERNIA TRUSS.—D. J. Cooper, New Orleans, La.
95,433.—TRUSS AND SUPPORTER.—D. J. Cooper, New Orleans, La.
95,434.—RAILWAY CAR COUPLING.—Wm. Cottrell (assignor to himself and F. G. Wiese), Bordentown, N. J.
95,435.—LATHING MACHINE.—George N. Creamer, Trenton, N. J.
95,436.—BEEHIVE.—L. H. Critchfield, Shreeve, Ohio.
95,437.—SPRING FOR GANG PLOWS.—H. N. Dalton, Pacheco, Cal.
95,438.—WRENCH.—A. B. Davis, Pleasantville, Pa.
95,439.—HAY DERRICK.—Winfield Denton, Iowa City, Iowa.
95,440.—HORSE POWER.—Joseph Diffendal and S. Hughes, Westminster, Md.
95,441.—METHOD OF FORMING MOLDINGS.—Joseph Dill and E. Rice, Grand Rapids, Mich.
95,442.—BAND FOR BOOMS AND GAFFS.—David Dryburgh, Philadelphia, Pa. Antedated Sept. 20, 1869.
95,443.—RAILROAD SPIKE.—P. J. Dwyer, Elizabethport, N. J.
95,444.—BOILER FEEDER ALARM DEVICE.—J. W. Ebert and E. C. McCloy, Zanesville, Ohio.
95,445.—APPARATUS FOR EVAPORATING AND DECOMPOSING LIQUIDS.—Albert Eckstein (assignor to "Zdenks Ritter Von Wessely"), Vienna, Austria.
95,446.—TURN TABLE.—L. W. Emmart and E. D. Griffith, Washington, D. C.
95,447.—BALING PRESS.—C. J. Emmett, New York city.
95,448.—HOISTING MACHINE.—Wm. Eppelsheimer (assignor to himself and E. A. Trapp), San Francisco, Cal.
95,449.—SNOW PLOW.—C. L. Ericzon, Salt Lake, Utah Territory.
95,450.—FIXING PUDDLING AND BOILING FURNACES.—M. Z Evans, Ormsby, Pa. Antedated Oct. 1, 1869.
95,451.—HAY RAKER AND LOADER.—Newton Farlow and J. A. Ham, Sullivan, Ill.
95,452.—DEVICE FOR SUPPORTING THE SHAFTS OF VEHICLES.—Rubin Fink and Reuben Daveler, Lancaster, Pa.
95,453.—WHEELED CULTIVATOR AND PLOW.—Sam'l Fisher, Hightstown, N. J.
95,454.—SAUSAGE STUFFER.—Charles Forschner, New York city.
95,455.—TOY TOP.—Henry Foulkes, Utica, N. Y.
95,456.—BEARING FOR SPINDLES IN SPINNING MACHINES.—J. B. Fuller, Norwich, Conn. Antedated Sept. 16, 1869.
95,457.—ATTACHING HANDLES TO CUTLERY.—J. W. Gardner (assignor to "Lamson and Goodnow Manufacturing Co."), Shelburne Falls, Mass.
95,458.—HARROW.—D. L. Garver, Hart township, Mich.
95,459.—MANUFACTURE OF COAL GAS.—Wm. Gibson, Cambridge, Mass.
95,460.—LAMP BURNER.—E. L. Gilman (assignor to himself and F. Houghton), Somerville, Mass.
95,461.—HOT-AIR FURNACE.—B. Gommenginger and C. W. Trotter, Rochester, N. Y.
95,462.—MACHINE FOR DRAWING FLAX, ETC.—John Good, Brooklyn, E. D., N. Y.
95,463.—KNIFE GUARD.—E. A. Goodes (assignor to the Philadelphia Patent and Novelty Co.), Philadelphia, Pa.
95,464.—WASH BOILER.—S. A. Goodwin, Buffalo, N. Y.
95,465.—PROCESS OF PREPARING ALIZARINE.—Chas. Graeb, Frankfort-on-the-Main, and Charles Liebermann, Berlin, Prussia.
95,466.—CARRIAGE SEAT.—S. P. Graham, Columbus, Ohio.
95,467.—HARROW.—P. S. Graves and P. B. Parcell, Ashmore Ill.