ENGINEERING INVENTIONS.

A car truck has been patented by Mr. John R. Fish, of Grand Rapids, Mich. The equalizing bars are so arranged that the frames connecting the journal boxes are entirely relieved of all the weight of the car and load, the bars extending entirely over and resting on the springs of the axle bearings.

An improved means of packing, lubricating, and cooling the pistons of air compressors has been patented by Mr. Charles F. Ruff. of Pbœnixville. Pa. The piston has annular grooves to receive water, and works in a cylinder with a larger annular groove in which water circulates, the water in the several grooves making a close joint, and packing, cooling, and lubricating the piston.

A reversing and cut-off gear for engines bas been patented by Mr. Andrew F. Johnson, of Stillwater. Minn. This invention covers a special construction and arrangement of parts, so that a direct action is established between the load and the engine valve with out the intervention of a centrifugal governor operated by the velocity and requiring a certain period of time for its operation.

A feed water heater has been patented by Messrs. Patrick McGivern and William E. Frye, of Crestline, O. A detachably supported water table is located in the fire box with feed water and delivery pipe connections, the heater being supported by the pipe connections and the side sheets of the furnace, and the pipe connections having outside joints back of the fire box, where they can be connected or disconnected at will.

MECHANICAL INVENTIONS.

A waterproof journal bearing has been pa tented by Mr. Nicbolas W. Godfrey, of Northport, N. Y. The invention covers a novel construction of socket bearing, with lining, flexible packing, and washer, to protect the journals of shafting in excavators and water, from contact with water or sand.

A flier for spinning machines has been patented by Mr. Leedbam Binns, of Paterson, N. J. The tles, cans, etc., has been patented by Mr. Bernhard object is to overcome the present difficulty of the eye Moebius, of Cbihuahua, Mexico. The invention consists of the flier becoming notched by the wearing of the in a fibrous bag or covering to be passed over a bottle tbread, and this invention provides means for causing or other vessel, part of the covering extending into a the thread to have a lateral traverse along the leg or liquid which is absorbed by the fibers and is evaporatarm of the flier, so there will not be a single contact point as at present.

block for saw mills, has been patented by Mr. Robert its lower part a closed annular warm water or air R. Parsons, of Jackson, Miss. The setting shaft is chamber, in combination with a snrrounding cold water geared with a rack on the under side of the head block, the shaft having its bearings in the block, and there being a spring applied thereto and to the head block, with various special combinations and arrangements of parts.

An improved wrench has been patented by Mr. Dwight M. De Silva, of Corning, N. Y. The jaws are pivoted to a head block, whereon a handle is also pivoted between arms of the jaws, extending back of the pivots, on which cams of the head of the handle act so as to cause the jaws to bite, and to hold with great power, when the bandle is turned, on a nut, pipe, or other object.

A thread separator for ring spinning frames has been patented by Mr. Gilman Jaquith, of Maysville, Ky. This invention consists in a continuous construction of separator throughout the whole length of the ring rail, of specially advantageous form, its small columns or supports being arranged back of the center of the ring rail, leaving the front or working side open or clear, so the travelers on the rings are easily reached by the fingers of the operator.

+++ AGRICULTURAL INVENTIONS.

A thrashing machine has been patented by Mr. John A. Beam, of Baden, Ontario, Canada. In combination with specially devised crank shafts and rakes 'are perforated plates, the rakes having greater throw than the plates, so the machine $\bullet \text{perates}$ with small power, has increased capacity, and is capable of excellent work.

A hay stacker has been patented by Mr. James B. Matlock, of Huntsville, Mo. The hay is collected with a rake in the ordinary manner, and the loaded rake is drawn to and upon the bars of a frame, where it may be connected with sliding catches, and elevated by drawing upon ropes, and then automatically released upon the stack.

A potato digger has been patented by Mr. Willis Dodge, of Presque Isle, Me. In combination rotary, with a periphery which is an eccentric curve, or with a draught beam and scoop is a shaker or screen pivotally suspended, and a specially shaped crank shaft having a lower forward extension engaging a grooved ${\tt csm}\,$ disk, the scoop passing the potatoes backward over the screen, which is agitated to separate them from the

belt is made of webbing, to which is buckled elastic struction and arrangement of parts for effectively opewebbing and elastic hangers, which have loose sliding rating a scraper, and for readily causing it to dump itrings to receive the strings of an absorptive pad.

A pipe stem has been patented by Mr. Jur. gen P. Lange, of Butler, N. J. The stem has a spirally grooved core with longitudinal passages and transsmoke, and an aperture which provides for its separation,'so as to keep dampness from the bowl.

An improved window and door lock or buton has been patented by Mr. Evander B. Newcomb, of Corydon, Iowa. It is simple in construction and no spring is needed, but by it the sashes may be locked when fully closed, or the lower sash supported when raised to its fullest height or only partially raised.

A washing compound has been patented by Annie E. Rhoads. of Baraboo, Wis. It consists of sal soda, saltpeter, and gum camphor, combined in certain proportions, and used in slightly different ways for the varied work of cleaning dirt from clotbes, and spots from floors, ceilings, woodwork, carpet, etc.

A street cleaning machine has been patented by Mr. Beekman Van Gaasbeek, of Mount Vernon, N.Y. A truck carries a water tank, a compressed air chamber, and a water and air distributer, pipes from which may be so set as to sweep the dirt to the curbstone or point desired, there being also means for keeping the water and air hot for melting snow and lice.

A measuring device for surveying and other purposes has been patented by Mr. Alfred Atkins, of Wanganui, New Zealand. There is a wire in a series of sections, swivels uniting the sections, tallies, and a reel, all furnishing an improved means of measuring in an uneven country.

A sugar dumping wagon has been patented by Messrs. James D. Edwards and Leon F. Haubtman, Mr. Marcus M. Bowers, of Baltimore, Md. The flare of of New Orleans, La. The invention consists in a wagon box provided at one end with a means for hinging it, and at the opposite end with means for receiving a rope

A refrigerator for cooling contents of boted, thereby cooling the contents of the vesse

A creaming can has been patented by Mr. A saw mill set works, or improved head John A Kendall, of Hamilton, Mo. The can bas at guided, steadied, and rotated while being painted. vessel, to keep the lower portion of the milk warmer Young, of Mount Carmel, Pa. Combined with an elethan that at the top for a period, during which the cream will rise rapidly.

A drum and cymbal clamp has been patented by Mr. Perry W. Fair, of De Kalb, Ind. The clamp device has a seat and stud screw for attaching the cymbal, and a bottom and flange for seating substantially on the hoop of the drum, forming a simple and quickly adjustable device to make a substantial connection of the cymbal to the drum.

A gate opening and closing apparatus has been patented by Mr. Amon W. Chilcott, of Mattoon, Ill. This invention covers a special construction and combination of parts in mechanism for operating sliding gates, and is an improvement on a former patent issued to the same patentee, whereby the operation is made more easy and convenient.

A bosom board has been patented by Mr. Samuel Maxim, of Wayne, Me. The invention covers a special construction and arrangement of the clamping device for bolding shirt bosoms while being ironed, in that class of ironing boards which have a projection to | line succeeding impressions, or observe previous sten go through the neck and a clamping part to hold the bottom of the shirt.

An improvement in tombstones has been patented by Mr. Solomon R. Miller, of Mount Union, Pa. The invention covers a casing for receiving a picture, and adapted to be secured on a tombstone, the casing having a rubber lining which holds the glass covering the picture air and water tight, and there being a washer or packer between the cover and the casing

An air cooling refrigerator has been patented by Mr. David Sanderson, of Ottawa, Ill. The ice rack bas a curved plate or deflector at the under side of its central upper portion, in combination with a hoppershaped ice bed with a central oblong air passage in its lower coavergent portion, so air will be caused to circulate well around the ice, and thus cool the air in a room.

A trimmer for sewing machines has been a curve of constantly varying radius, and with saw teeth servations in the curved cutting edge, so the trimmer is made to cut positively, without causing the wedging action which antagonizes the feed.

An improved hame clip has been paten that by removing a screw the clip may be detached from the hame, and also from the hame tug, so that belder either may be changed in the harness if desired without destroying the hame clip, and the clip is cheap, practical, and durable.

self by the preponderance of weight in a certain portion thereof, or for carrying the load if desired.

An elevator bucket has been patented by

Mr. Joseph A. Holmes, of Greenland, N. H. This is verse passages, a reservoir for n icotine rising with the an improvement on an invention formerly patented by the same inventor, and provides that the bucket shall be attached to the endless band at or near the center of its length, so that when the buckets are large or heavily laden they will not pull away from the band.

> A time lock has been patented by Mr. Moses C. Hawkins, of Edinborough, Pa. The invention con-sists mainly in what is called an "accident lever" with inclined surface for engaging the time catch when the accident lever is thrown forward by the recoil of the going barrel on the breaking of a spring.

> A driving mechanism for sewing and other machines has been patented by Mr. Samnel Maxim, of Wayne, Me. There is a driving ring with a face groove in which the heads of studs held in pivoted plates fitted in recesses of pivoted drive links bite alternately at opposite sides of the drive ring groove on reverse movements of the treadle, to impart continuons rotary motion.

A cheese press or mould has been patented by Mr. Lewis A. Rites, of Chester, N. Y. The invention covers two correspondingly recessed compressing rollers arranged diagonally to each other in the frame, to facilitate the feeding of the curd and the dropping out chain for connecting the swivel on the inner end with a of the compressed rolls, there being also a hopper of special form in connection with the recessed compressing rollers.

An improved bell has been patented by the bell is made with a series of interrupted straight lines, there is a concave form for the bead, and a hammer swell within the inside of the shell, whereby the strength of tone is increased and the bell is less liable to break from sbrinkage, tension, or strain of the metal in casting.

An apparatus for painting bobbins has been patented by Mr. Lnther C. Baldwin, of Manchester, N. This invention is in part the same as that covered Н. by a former patent of the same inventor, where the bobbins have a prolonged travel on an endless moving belt, and there is a novel arrangement of belts whereby the bobbins are carried in a small space, so they are

A safety catch for elevators has been pa tented by Messrs. August J. Becker and Joseph B. vator car is a frame held on the same and supported by springs; the snspension rod of the cage is connected by chains with the frame, so that when the hoisting cable breaks, cams or eccentric disks will be pressed against the guide posts and lock the cage or car in place

An ash sifter has been patented by Mr. Henry C. Pigueron, of Spring Lake, N. J. On opposite sides of the sieve are lugs with apertures through which a square rod is passed, the rods not turning in the lugs, so the sieve cannot tilt; the coals and cinders cannot pack between the rod and the screen, and the sieve can be emptied more readily than those in which the rod is passed through the sides.

A stencil plate has been patented by Mr. Romeo E. Ghezzi, of New York city. The invention covers a stencil plate provided upon its face with raised

brush guides on each side of the perforations to restrict the color during each application to a single perforated character or device, the plate having also blank spaces to afford facility, when shifting the plate, to space or cilings.

A firemen's tower has been patented by Mr. Eugene B. Magnus, of South Norwalk, Conn. This invention consists in a certain combination of ladders and means of connecting them, the whole forming a scaling tower for firemen, which may be set on the ground at a distance from a burning building, whereby convenience is afforded for firemen to stand in different positions, the tower being readily put together and taken apart.

A machine for pulverizing clay has been patented by Mr. Marshall P. Phillips, of Lakeland, La. Two opposite sets of rotary saws are operated in a hopper with an intermediate partition having pins, and a cross partition arranged above the saws, the fineness of the product being regulated by the set and shape of the saw teeth, the distance between the saws, the position patented by Mr. Daniel Maus, of Utica, N. Y. It is of the partitions, and the speed at which the saws are

> A mail bag has been patented by Messrs. Frederick Michael and Robert Williams, Jr., of Eaton O. In the edge of each side, at the opening, is a longitndinal pocket, for receiving welts on a sliding cover piece, so the sides of the pouch are drawn together and

Special.

MRS. MARY A. LIVERMORE'S TRIP TO EUROPE.

As one of the clearest thinkers on the various social problems of the day, and as a lecturer of rare attract-iveness and ability, Mrs. Mary A. Livermore has long been widely known both in this country and in England. Among women who have taken the platform for the discussion of questions particularly affecting their sex, Mrs. Livermore is without donbt the ablest representative, and the most convincing in her arguments and il-Instrations. A few years ago her health became so mucb impaired that she was forced to retire from the lecture field. But the interregnum in her work was not of long two pawls, one engaging a ratchet on the going barrel duration, and her wide circle of friends and admirers and the other a stationary ratchet the lever having an soon welcomed her back again. How and by what means she was restored to health is related in the following deeply interesting letter :

MELROSE, MASS., Feb. 1, 1884

"DRS. STARKEY & PALEN, 1009 and 1111 Girard St., Philadelphia.—Dear Sirs: I am entirely willing to make a statement of the benefit I have received from the Compound Oxygen Treatment, and that you should make such use of it as you please.

"Four years ago thisspring, at the end of a very severe and exhausting winter's work, I found myself ntterly broken down in health. My superb constitution had hitherto carried me triumphantly through every task I had tmposed on myself, and had been equal to every phase of protracted labor that had fallen to my lot. But I was now completely prostrated, with no power of recuperation. I could sleep but two or three hours of the twenty-four, and then only in a semi-sitting position, be-cause of a difficulty of breathing; suffered excruciatingly from sciatica and neuralgia of the stomach; experienced the torment of indigestion and the train of ills that follow, and was harassed by optical illusions that were a source of great discomfort, although I knew them to be illusions. My mental depression was as severe as my physical prostration. I believed the hope-less invalidism which I had most dreaded had come to me, and my chief aim was to hide myself from the friends and acquaintances who were afflicted on my account.

"Myphysician recommended a trip to Europe, and my husband accompanied methither. The change bronght only palliation of my troubles, but no radical improvement. While in England some American acquaintances told us of the Compound Oxygen Treatment, and they were enthusiastic in their praise of it as the surest reme-dial agent in cases like mine. They emphasized their statements by narrations of complete cures which had been wronght by it of which they were personally cognizant.

" My husband immediately ordered from London the materials for a home treatment of two months. I used it for a month, punctiliously obeying the directions sent for its use, before I began to rally. Then my return to good health was rapid, and since then I have enjoyed almost uninterrupted perfect health and almost yonth-fnl vigor. I resumed work immediately, and have assiduonsly followed the most laborions vocation ever since, although long past the time of life when it is considered safe to toilseverely and unremittingly.

"I have never discontinued the use of the Treatment since I began it. There have been few days in the last three and a balf years when I have omitted it. I under-stand and accept the *rationale* of the Treatment, and depend on it for vigor and strength, as I do on food. I have recommended it to scores of people suffering from nervous prostration and chronic ailments, some of whomare rejoicing in restoration to health, while others, lacking persistence in the use of the Compound Oxygen, bave not been been benefited; for patience and persistence in its use are essential, if one would be cured of chronic illnesses or lifted from a depth of physical depression.

Yours truly,

MARY A. LIVERMORE."

In another letter to Drs. Starkey and Palen. Mrs. Livermore says: "I have always and everywhere proclaimed the excellence of the Compound Oxygen Treatment, and have persuaded a great many people to use it. I could not live without it, unless I abandoned all my work, and simply existed, and I would rather die than do that."

Any information in regard to this remarkable treat ment will be promptly furnished by Drs. Starkey and Palen, 1109 and 1111 Girard Street, Philadelphia. If you write for their Treatise on Compound Oxygen, they will mail it to your address.

Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office asearly as Thursday morning to appear in next issue.

Wanted.-Specialties in Cast Iron to manufacture, heavy or light. Address J. B., Box 306, New Haven, Ct. Blake's Patent Belt Stnds. Strongest & best fastening for Leather & Rubber Belts. Greene, Tweed & Co., N. Y. All Books cheap. School Electricity, N. Y.

Munson's Improved Portable Mills, Utica, N. Y.

Drop Forgings. Billings & Spencer Co., Hartford, Conn. Wanted .- Patented articles or machinery to make and introduce. Gaynor & Fitzgerald, Lexington, Ky.

earth.

*** MISCELLANEOUS INVENTIONS.

A cover for water closet seats has been patented by Mr. Dale O. Cowen, of Batavia, O. This invention provides for seat sheets to fit the apertures in water closet seats, and cover or protect the person from contact with any part thereof.

A spring wagon has been patented by Mr. Thomas P. Yates, of Factoryville, N. Y. This is a novel construction for combining the spring and axle in one device, and so calculated to simplify the construction and improve the operation of spring wagons.

Percy Cole, of Pipestone, Minn. This invention is an improvement on a former patent issued to the same patentee, and covers an improved means of holding a a left worm gearing into worm segments carrying the bag in connection with a hopper while the bag is being last and presser foot, so the last and presser foot are filled.

An earth scraper has been patented by substantial gate. easily adjustable when it sags, and An improvement in supporting belts forabby Nannette Amia, of Brooklyn, N.Y. The supporting i Davenport, Iowa. This invention covers a special con-i carriage or vehicle.

An improved horse power has been patented by Mr. August Zastrow, of La Harpe, Ill. The invention covers special constructions of belt casing with guide pulleys or idlers journaled to guide the belt clear belt casing to be depressed where the animals pass over it in working the sweep.

A machine for leveling boot and shoe soles A bag holder has been patented by Mr. | bas been patented by Mr. Setb D. Tripp, of Lynn, Mass. The machine is made with a shaft connected with the drive shaft by beyeled gear wheels, and with a right and made to move in unison.

the pouch closed by passing the cover and welts into the

A photographic plate holder and case has been patented by Messrs. Sebastian S. Peckinpugh and George J. White, of Big Rapids, Mich. In combination with a plate holder is a plate or strip with an adjusting screw, so the plate can be adjusted to exert a greater or less pressure against the photographic plate. to press the latter firmly against the front of the plate of frictional contact with the ground, and permit the holder, to facilitate their carrying and transference into the plate holder of the camera without exposure to the ligbt.

> A gate hanging and operating apparatus has been patented by Mr. John H. Brafford, of Red Oak, O. Combined with a pivotal binging rod, the gate has upper and lower hinging brackets and an intermediate arm, the rod passing through brackets and arm, and the arm carrying a pulley or roll, a latch rod, and operating cords, the whole making a simple and

Sewing machine, water closet. & other light castings made to order. Lehigh Stove & Mfg. Co., Lehighton, Pa. "How to Keep Boilers Clean." Book sent free by James F. Hotchkiss, 86 John St., New York.

Stationary, Marine, Portable, and Locomotive Boilers specialty. Lake Erie Boiler Works, Buffalo, N.Y.

Railway and Machine Shop Equipment. Send for Monthly Machinery List to the George Place Machinery Company, 121 Chambers and 103 Reade Streets, New York.

The Hyatt filters and methods guaranteed to render all kinds of turbid water pure and sparkling, at economical cost. The Newark Filtering Co., Newark, N. J.

If you want the best cushioned Helve Hammer in the world, send to Bradley & Company, Syracuse, N. Y.

"The Sweetland Chuck." See ad. p. 252.

Hoisting Engines for Mines, Quarries, Bridge Builders, Railroad Construction, etc. Send for catalogue. Copeland & Bacon, New York.

Walrus Leather, very thick, for polishers. Greene, Tweed & Co., 118 Chambers St., New York.

Steam Boilers, Rotary Bleachers, Wrought Iron Turn Tables, Plate Iron Work. Tippett & Wood, Easton, Pa. Iron and Steel Drop Forgings of every description. R. A. Belden & Co., Danbury, Ct.

Iron Planer, Lathe, Drill, and other machine tools of modern design. New Haven Mfg. Co., New Haven, Conn. Pumps--Hand & Power, Boiler Pumps. The Goulds

Mfg. Co., Seneca Falls, N. Y., & 15 Park Place, New York. For Freight and Passenger Elevators send to L.S. Graves & Son, Rochester, N. Y.

Best Squaring Shears, Tinners', and Canners' Tools at Niagara Stamping and Tool Company, Buffalo, N. Y. Lathes 14 in. swing, with and without back gears and screw. J. Birkenhead, Mansfield, Mass

If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian putert, \$40. Various other foreign patents may also be obtained. For instructions Address Munn & Co., SCIENTIFIC AMERICAN Patent Agency, 261 Broadway, New York.

Guild & Garrison's Steam Pump Works, Brooklyn, N. Y. Steam Pumping Machinery of every descrip tion. Send for catalogue.

For Power & Economy, Alcott's Turbine, Mt.Holly, N. J. Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J Supplement Catalogue .- Persons in pursuit of information on any special engineering, mechanical, or scientific subject. can bave catalogue of contents of the Sci-ENTIFIC AMERICAN SUPPLEMENT sent to them free The SUPPLIEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physi-cal science. Address Munn & Co. Publishers, New York.

Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 139 Center St., N. Y.

Nickel Plating .- Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions. etc. Complete outfit for plating, etc. Hanson & Van Winkle. Newark, N. J., and 92 and 94 Liberty St., New York.

Curtis Pressure Regulator and Steam Trap. See p. 222 Woodwork'g Mach'y. Rollstone Mach. Co. Adv., p.222. C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 221.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423. Pottsville, Pa. See p. 237. Stephens Bench Vises are the best in use. See ad., p.237.

American FruitDrier. Free Pamphlet. See ad., p. 253. Best in the world. Patent chuck jaws, emery wheel machinery, and automatic machines to grind straight and sharp. Planer, veneer, logwood, leather, paper mill, plate, cottonseed, and other long knives. AmericanTwist Drill Co., Meredith, N. H. (Established 1865.) Brass & Copper in sheets.wire & blanks. See ad.p. 54.

The Chester Steel Castings Co., office 407 Library St. Philadelphia, Pa., can prove by 20,000 Crank Shafts and 15,000 Gear Wheels. now in use, the superiority of their Castings over all others. Circular and price list free.

The Improved Hydranlic Jacks, Punches, and Tube Expanders. R. Dudgeon. 24 Columbia St., New York. Hoisting Engines. D. Frisbie & Co., Philadelphia, Pa.

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 253. Upright Self-feeding Hand Drilling Machine. Excel. ought they to have? What size steam and exhaust lent construction. Pratt& Whitney Co., Hartford, Conn. Catalogues free .- Scientific Books, 100 pages; Electri-

cal Books, 14 pages, E. & F. N. Spon, 35 MurraySt., N. Y.

NEW BOOKS AND PUBLICATIONS.

ILLUSTRATED ART CATALOGUE. Cassell & Company, 739 Broadway, New York. Price, 50 cents.

A very comprehensive and attractive hand book, including a complete catalogue of all the paintings and other art works, numbering 700, now on exhibition at the National Academy of Design in this city. The studio address and a brief biography of several of the artists are given, and engravings of the most important of their works on exhibition.



HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Namesand addresses of correspondents will not b given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring specialinformation which is purely of a personal character, and not of general interest, should remit from \$1 10 \$5, according to the subject, pend : expe obtain such information without remuneration. Any numbers of the SCIENTIFIC AMERICAN SUPPLE-MENT referred to in these columns may be had at the office Price 10 cents each. Correspondents sending samples of minerals, etc. for examination, should be careful to distinctly mark of label their specimens so as to avoid error in their identification.

through galvanized pipe? A. Galvanized iron pipe is largely used for conveying water, and is not considered very unhealthy if the water is cold and not allowed to stand in the pipe. Cast iron pipe is better, however. (3) B. K. F. asks what the mode of printing from engraved or stamped music plates is like. A. Music printing is done in the same way as copper plate printing. The plate is covered with ordinary printing ink by a dapper (plate warm enough to handle easily without blistering the hands); rub off the exces of ink with a rag, then rub the palm \cdot of the band

with some whiting and lightly rub over the face of the plate. This requires a little dexterity to wipe in different directions, so as to leave the plate surface bright and the ink in the lines. Then place the dampened paper upon the plate and pass under the roller, which should be blanketed. The press is a rolling platen, with a roller 6 or 8 inches diameter over it and rollers or wheels under it.

(4) G. L. G. asks: What is the pressure per square inch on a steam cylinder 1 foot in height, 8 inches in diameter, when Fahrenheit thermometer shows 420°, and will a brass cylinder same dimensions, a quarter of an inch thick, stand the pressure? If not, how thick necessary? A. 296 pounds above atmosphere. Yes, if perfectly sound, but we would recommend that it be not less than three-eighths of an inch thick, and tested to 450 pounds by hydraulic pressure before submitting it to that pressure of steam, viz., 296 pounds.

(5) O. H. T. asks (1) how to prepare green paint which will stand the heat of steam and not scale off and change color, for painting a steam engine. A. Use a chrome green ground in Japan, and put on in several thin coats, and then coat it over with a good body wearing varnish. 2. Please give the dimensions for making a water tank which will hold four barrels of water. A. Make the tank to hold 16% cubic feet, or if round, 21/2 feet diameter, 4 feet 2 inches high, or 3 feet diameter, 2 feet 10 inches high. If square, 21/2 feet square by 2 feet 8 inches high.

(6) S. S. G. writes: 1. Length and size of ore, weight and shape of ball, weight of powder, and all other conditions being the same, which will throw ball the greater distance-a smooth bore or rifled gun? Does not rifling impede the discharge of the ball, and does it do any other good than to insure greater accuracy to the direction of the shot? A. Smooth bore is best for round bullets. The rifling is necessary for long bullets. 2. What horse power is required to sustain 33,000 pounds immovably without other support? A. Horse power is supposed to be a moving power, and is not used in sustaining weight immovably.

(7) L. W. McC. writes: We are running an old fashioned pair of slide valve engines, cylinders 11 inches bore, 36 inches stroke, 70 pounds boiler pressure. We have some controversy on several points. We want not so much a maximum of power (that being ample) as to get say 40 to 70 horse power with a minipipes? At what point of stroke ought engine to receive steam to insure economical or harmonious working together? Would we get any very perceptible reduction of fuel, by reducing the driving pulley (which is 91/2 feet), enlarging the driven (4 feet), and increasing speed (now 64)? If so, at what speed and pressure of steam would we get the highest economy? Would the saving, if any, be attributable exclusively to increased speed and pressure? Or, would the reduction of driver of itself contribute to the result? One engineer says the economy would be the result only of increased piston speed and pressure, while another says the change in pulleys would also help. Is there any efficiency in ammonia fortior in dissolving or loosening scale on boiler plates and tubes? If so, how used and in what quantities? Would the use of crude petroleum prevent scale? If so, how used, and in what quantities, and is it safe? We use a tubular boiler 60 inches by 16 feet, with 90 three inch tubes, fed from spring water strongly impregnated with lime and (supposed) magnesia, which forms scale rapidly and gives us trouble. The water passes through an old boiler, and is heated with exhaust before being pumped into boiler. Can you tell us how to get rid of this scale and prevent it? We have used various compounds, also soda, tanner's liquor, etc., with only partial and varying results. How many feet of grate surface ought the furnace to have? Distance from grate bars to boiler, from grate bar to bottom of ash pit? What size opening or throat at bridge wall and at back end of the boiler? A. You would not materially economize in fuel by altering the ports or changing the steam or exhaust pipes. 3 inch steam and 316 inch exhaust pipes are ample foreach engine-4 inches main steam. Knowing the point of cut-off of the valve would enable you to decide the best running adjustment of the valve. Cutting off at one-third to one-half the stroke for engines without automatic cut-off is fair practice. The autotwice a week. In feeding the coal never cover the whole grate at once with fresh coal, but feed at the front and gradually push the coal back, always keeping the bright fire at the back of the grate. This tends to consume the smoke. As you have tried nearly all of the chemical compounds for scale, we can only recommend you to try some of the mechanical boiler cleaners

(8) W. T.-The vernal colure for 1884 is 28° 15' 26" west from the point of correspondence of the signs of the zodiac and the signs of the constellations. the time of which is supposed to have been fixed as a reckoning point 140 years B.C.; the precession of 50°26"×2,024 years giving the above position for this year-28° 15' 26". You will find Norton's Astronomy a sufficient guide in any mathematical calculation that you may require. The Nautical Almanac for this year will give you the exact data.

(9) J. H. D. writes: I have been told that the sunhas receded in the equinoctial point of the ecliptic until, though the equinox nominally takes place in Aries (that is, the sign), it really bappens in the 30th degree of the constellation Aquarius. Is it so? A. The zodiac is divided into 12 equal parts of 30° each; the division commencing at the vernal equinox, which corresponds with the first point of Aries, following from west to east in the order of the signs. The first point of the sign Aries is the beginning of the reckoning for right ascension and longitude. 'The signs of the zodiac corresponded with the constellations of the same name about 140 years B C., at which time the arrangement of the zodiac and the naming of the constellations was supposed to have been established. Since then the equinoctial and solstitial points have retrogradet, nearly one sign; so that now the vernal equinox, or first point of the sign Aries, is near the beginning of the constellation Pisces. In consequence of the precession of the equinox the star maps have to be corrected from time to time, the older maps not representing the true reck oning in right ascension. Thus from precession alone the equinox has receded in 2,024 years 28° 15' 26", or 50.26" per year.

(10) H. B. G. writes: The distance from the mouth of the Cumberland River to Nashville, Tenn., is200 miles, with a fall of fifty feet, or 3 inches to 1 mile, Width of the Cumberland River is about 175 yards. Now, in case of the Ohio River being very high, will it affect the flow of the water in the Cumberland River at Nashville? A. A large rise in the Ohio at the mouth of the Cumberland would very sensibly affect the flow at Nashville. We do not know the topography of the stream, and cannot be expected to give an intelligentanswerupon the mere data of 200 miles with 50 feet fall, or 3 inches to the mile. The depth and volume of water flowing in the Cumberland has much to do with the amount of back water from a rise in the Ohio. It is also necessary to know the amount of rise in the Ohio in order to estimate the rise at Nashville.

(11) T. L. asks: What is zylonite? What vulcanized fiber? What is the correct name of the filaceous plant known commonly as " corn geranium"? A. Zylonite is fiber of cotton or linen and sometimes wood pnlp combined with camphor by the alcoholic process, and pressed into a homogeneous mass, or only another name for celluloid. Vulcanized fiber is fiber changed by a chemical combination through the aid of heat. The word vulcanized was coined in the rubber trade. Ask your florist about " corn geranium."

(12) C. A. C. asks: Who established the first locomotive works for building railway engines, and when? A. We think Geo. Stephenson, in England; probably Ross Winans established first works in this country

(13) W. W. E. asks (1) the rule to find what quantity of water will flow through a pipe when you have the size of pipe, length of pipe, and fall given. A. The result is affected by the character of the pipe (material) and bends. Rule given in Haswell's Pocket Book, page 385:

 $39.27\sqrt{\frac{h d^{2}}{l}}$ = volume of discharge in cubic feet per

second, in which h=head in feet, d diameter in feet, and l=length in feet, in this case,

200

 $39.27 \times \sqrt{50 \times 0.1665}$

2. I would like the rule for finding the pressure, friction, velocity, and quantity of water delivered, when you have all the above points to compute by. A. The pressure is, 04335 pound per square inch for each foot of head. In Haswell's Pocket Book you find the rules of hydraulics fully treated, also in Trautwine's Engineer's Pocket Book.

(14) F. W. R. asks how to calculate the pressure of water through an iron stand pipe 20 feet high, 2 inches in diameter, water flowing in at the top and discharging at the bottom through an orifice of a quarter of an inch in diameter. Should the pressure be increased or diminished if the stand pipe were reduced to 10 feet high and diameter increased to 4 inches? matic cut-off engines are made to vary from one-tenth A. The pressure is determined by the height or head matic cut-off engines are made to vary root of maintained in the stand pipe; the dataset, the points that are of great importance in the condition of into or out of, does not affect the pressure. The pres-not stat are of great importance in the condition of sure is 04335 pound per square inch for each foot of sure is 04335 pound per square inch for each foot of

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

April 8, 1884,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]
Abrading machine, F. W. Coy
Air filter, H. Flad
Animals, safety attachment for horned, G. W. Ritchie
Avie box, car, R. Brewer
Axie boxes, pattern for car, M. O'Mara
Axle truss, A. J. Beach 296,882 Axle, vehicle, S. T. Cavett 296,523 Bag. See Feed bag. Mail bag. 296,523
Bale tie, W. S. Chafey
Banjo, H. McCord
Battery. See Galvanic battery. Bed bottom, F. J. Robinson
Bed bottom, spring, S. S. Burr
Bicycle bearing, O. M. Mitchell 296,703 Billiard and pool table, G. A. Chasley 296,677 Board. See Bosom board.
Book rest, revolving, S. Robin
Tripp
Boots and shoes, outer sole for, A. A. Brooks 296,519 Boots or shoes, tacking machine for lasting, E. Woodward <i>et al.</i> 296 715
Bosom board, S. Maxim
Bottle wrapper, Novy & Henry 295,705 Bowl. fruit, D. C. Ripley 296457 Box. See Axle box. Letter box. Packing and
show box. Show box. Brick machine, J. Baillie
tation, P. Toglio
Buckle, vo. B. woouman 250,002 Buckle, rope halter, J. Gibbons
Buildings, adjustable cresting for, T. Rogers 296.458 Burglaralarm. G. W. Tallman
Burner, A. B. Lipsey
Button, J. Harrington
Buttons by electricity, machine for carding, L. Gillon
Can. See Creaming can. Car brake, electro-magnetic, H. S. Park
Car coupling, G. T. Jobson
Car coupling, Joralemon & Mabey
Car coupling, C. W. Spencer
Cars, sash adjuster for railway, A. K. Mansfield. 296,594 Carset stretcher 1 H Bruso 266,669
Carriage, child's, C. Bailey
Carriage perch iron. W. H. Cooper
priming, H. T. Hazard
Chain tip, watch, O. M. Draper
Chapper. See Cotton chopper. 296 650
Churn power, J. A. Boals
Cigar seller, mechanical automatic, Shiek & Cole. 295,468 Clamp. See Engraver's bangle clamp. Friction clamp.
Clay pulverizing machine, M. P. Phillips
Clock winding device, P. B. Cassidy
Colter, R. Kloss
Streever
Cotton chopper, H. D. Layman
Cotton gin house, W. F. Groves
Crank, tedder, F. Trump
Creaming can, J. A. Kendall
Curtain fature, A. Sweetland
Cutter head. J. D. Stirckler
Dental mould. J. W. Hayford
Doors, guiding and supporting device for San-
ders & Henderson
ompson
Drill. See Rock drill. Electric battery and lamp, portable, C. G. Gum-
UCL

(1) A. V. P. asks the style and size of lens and focus, etc., suitable for a camera obscura for outside sketching. A. A plano convex lens of 2 inches diameter, and 2 feet focus, makes a very convenient proportion of picture for sketching. A sharper de fined picture may be made by using two 30-inch focus lenses, 2 inches diameter, in a tube flat sides outward or back to back, 4 inches between the lenses.

(2) P. G. asks: 1. Will a windmill lift surface water through a 116 inch pipe to a tank 40 feet higher than water level, distant 400 feer.? A. A windmill will force water the distance and height named, the quantity depending upon the power of the mill 2.

faces upon the slide valves, loose piston from wear, the sustaining springs giving out and allowing the pis ton rings to run loose. The leak of steam at these points is very much overlooked in old engines. Cylinders should be rebored when they are found to be out of shape. An engine that has run ten to fifteen years, especially if of the horizontal kind. needs rehoring and new rings. Much of your loss in economy is derived from the use of two cylinders instead of one of equal nower. We do not recommend change in the relative size of pulleys or speed. The steam pipe should be well felted, and the top of the boiler covered 2 or 3 inches deep with fine light ashes if now exposed. As you say nothing about the kind of fnel used, we are to suppose that you are using bitnminous coal, which requires a peculiar method of firing. For this coal the boiler should be 3 feet above the grate. Grate 5 feet by 5 feet, or 25 square feet, if you are only using about 50 horse power. Your boiler is rated 60 effective horse power. Ash pit should be two feet deep from top of grate; area over bridge wall equal to area of tubes. Always keep a good flue brush on hand, and see that it Would it do to carry water for drinking purposes is used often and thoroughly; for bituminous coal, about \$12.00 per ton.

height or head of water.

(17) V. B. asks: What is used in graining machines to stain poplar lamber in imitation of Spanish cedar? A. Just exactly the composition of the stain used we cannot say, but quite likely a solution such as can be made by boiling 1/2 pound madder and 2 ounces logwood chips in a gallon of water and brush well over while hot ; when dry go over the whole with pearlash solution, 2 drs. to the quart. If not exactly the shade, it can be modified by altering the proportions of the ingredients.

(21) S. G. J. asks: For what is talc used? Is there more than one grade or quality of it? About what price will it bring in market? A. Talc is used extensively in soap making, and also for dressing sheep skins, leather gloves, etc. The domestic talc is used in the manufacture of paper, replacing terra alba for this purpose. A small amount of take enters into the composition of some lubricating compounds. The talc imported is considered to be of a superior quality as compared with the domestic. The average spot value is