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An oscillating engine has been patented by Mr. Douia C. Putnam, of Wayne Center, N. Y. The steam inlet and exhaust ports in the cylinder and the exhaust ports in the valve may be lengthened to any desired extent to permit quicker work in engines designed for any special duty, but the travel of the valve is in any case comparatively short, on account of the rocking movement of the cylinder.

A traction engine has been patented by Mr. Benjamin S. Benson, of Baltimore, Md. It has two obliquely arranged cylindrical boilers, with their higher ends in the middle 'and next to each other, the space beneath the cylinders forming the firebox, with hollow legs, which communicate with the water and steam space of the boilers, and the apparatus having an endless track chain with feet passing beneath, around, and over the boiler, with guide and truck wheels for the chain, to support the body of the engine and the track upon which it runs, with various novel features for re ducing friction and facilitating the guiding of the engine.

# AGRICULTURAL INVENTIONS.

A grain separator has been patented by Messrs. Francis Wadsworth and Henry N. Prentice, of Venice, O. It is intended to separate the straw and chaff from the grain at the same time, and then remove the unthrashed and partly thrashed heads and heavy impurities that may have passed through the thrashe and separator with the grain.

A seed planter has been patented by Mr. Louis S. Flatau, of Pittsburg, Texas. Its construction is such that as the planter is drawn forward the hopper and a stirrer wheel are revolved, the latter forcing seed out through discharge slots into a tube, through which and the tubular plow they fall into the bottom of the furrow opened by the plow, where soil is thrown upon it by covering plows.

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#### MISCELLANEOUS INVENTIONS

A lemon squeezer has been patented by Mr. Sheridan S. Badger, of Chicago, Ill. It has a fixed or stationary jaw, a hinged swinging jaw, and a handle or lever, so combined that the power from the commencement of the operation continues to be increased until the operation is completed.

A fire escape has been patented by Annie M. Jeffers, of Chicago, Ill. It is a spiral structure ranged along the windows of a buildings, and containing a ladder, being stretched or opened opposite the windows, and having safety chains at such openings, and also an alarm bell.

A pipe tongs has been patented by Mr. James J. Palmer, of Fall Brook, Pa. The invention consists essentially of tongs in which the binding contact surface is composed of a number of sections, and by removing or adding links or sections the tongs may be adjusted to fit almost any sized pipe.

A nail plate furnace has been patent ed by Mr. Simeon Bunn, of Belleville, Ill. It has double bottoms or decks, with openings, and outer walls with openings, so arranged that the products of combustion will be carried by a long, indirect passage, and the heat will be utilized to the greatest possible extent

A reflector has been patented by Mr. James E. McLaughlin, of Portland, Oregon. It is for gas, lamp, or other artificial lights, and is so made that four concave reflectors, spun up from rectangular sheets of metal and polished, can be conveniently kept in the desired position behind a burner.

A tag making machine has been patented by Mr. Harmer Denney, of Brooklyn, N.Y. This machine takes the paper from a roll, and by a series of automatic operations the tags are printed, cut, eyeleted, cut off, and their corners beveled, the machine being readily adjusted to make tags of different widths.

A motor has been patented by Mr. Jackson B. Miles, of Lincolnton, Ga. It is a spring motor intended for use in connection with churns to operate the dasher staff, and when wound up the mechanism works from fifteen to forty-five minutes, according to the speed at which it is allowed to run.

A tongue support has been patented by Mr. Milo M. Russell, of Hayward, Wis. The running gear of a wagon and its tongue is combined with a spring of peculiar construction, with lever and detachable connections for holding the tongue, whereby provision is made for adjusting the tension of the spring, and the whole heft is equalized.

 $\Lambda$  necktie fastener has been patented figures. by Mr. Daniel T. Freese, of North Amherst, O. It consists of a plate slotted twice to receive the tie, and with a forked arm bent over parallel with the slotted portion to receive the collar button, the arms of the fork being at right angles with the slots of the body of the plate.

A two wheeled vehicle has been patent-

grooves or pockets, while the bag or fiexible portion has its edges inserted and held in these pockets, with various other novel features

Mr. James F. Barringer, of Bennettsville, S. C. A Ushaped plate and rod are (so combined with cross pieces and arms as to make a holder in which broom straw or rattan can be clamped, as well as bagging, cotton waste or rope, to form a mop, and one can be easily removed and replaced by others.

A safety device for elevators has been patented by Mr. Peter Moran, of New Orleans, La. The object of this invention is to prevent the water in the tanks of hydraulic elevators from being worked so low as to empty the pipes and allow the car or cab to fall, and to this end a novel construction and combination of parts is provided.

A nutmeg grater has been patented by Mr. Albert L. Platt, of Bowling Green, Mo. It consists in a revolving barrel made of a spiral coil of steel wire having notched outer edges, combined with a block having a hole through it and a counter bole or hole at right angles, to form a case in which the spiral cylinder revolves.

A land channeling roller has been patented by Mr. Robert H. Banks, of Fort Lewis, Col. It is so made that as the machine is drawn forward plows open furrows in the ground and ribs pack or roll the bottom and sides of these furrows, while another roller rolls the surface, so as to form channels for irrigation purposes in rolled land.

A sawing machine has been patented by Mr. Daniel W. Smith, of Long Lake, Mich. The machine is attached to the log to be sawed, and then by moving hand levers up and down a reciprocating motion is imparted to the saw through a shaft and pitman, the motion of the saw being directed by a guide, while the log may be raised, lowered, or turned, as desired.

#### NEW BOOKS AND PUBLICATIONS.

DYNAMO-ELECTRIC MACHINERY. Bv Silvanus P. Thompson, New York and London: E. & F. N. Spon.

This is a second and much enlarged edition of a volume published by the same author in 1884, which was itself based on the Cantor lectures of Professor Thompson before the Society of Arts, in 1882. The rapid multiplication of forms and perfecting of details in dynamo-electric machinery which has taken place in the last four years, is well illustrated in a comparison of the facts given in the lectures of 1882 with the accumulated material that is presented in the present volume of 500 pages. Almost every kind of dynamo which has attracted any considerable attention is here described with sufficiently full explanations of details to render an understanding of its construction and operation perfectly easy, even if one has never before made a special study of the subject. A good deal of attention is given to special forms of motors and their government, and to the testing of dynamos and motors. In the appendix is a short but very interesting chapter, covering statistics and comparisons of some recent dynamos, in which the author states that "the old pattern Brush machine gave only about 59 watts per pound of copper on the armature, while the new pattern Brush armature with the same field magnets gives about 90," and suggests that "if the field magnets were remodeled, and their cores made of soft wrought iron, the number of watts per pound of copper in the armature might be raised to 200 or more, and the old 40-light machine which, as now improved, supplies 60 arc lights, might then yield current for over 100 lights." The author also notes improvements in the Gramme machine from 87 watts per pound of copper in an old machine up to 306 watts in a late pattern, and asks correspondents for further statistical information of this character, "in view of the possibility of further' editions of this work being called for at a future date."

THE DETERMINATION OF ROCK-FORM-ING MINERALS. By Eugene Hussak. ING MINERALS. By Eugene Hu New York: John Wiley & Sons.

The authorized translation of this German work has been made by Dr. Erastus G. Smith. of Beloit College, Wis., for use more especially by the students of colleges and universities. Part I, treats of the methods of investigation, including the preparation of microscopical sections and proper polarizing apparatus, giving optical and mechanical methods, and describing the mechanical separation of rock-forming minerals, while Part II. gives an elaborate series of tables for determining minerals, accompanied by a great number of

METHODS OF RESEARCH IN MICROSCOP ICAL ANATOMY AND EMBRYOLOGY: By Charles O. Whitman. Boston: S. E. Cassino & Co.

This volume is intended for everyday use in the zoological laboratory, to secure uniformity in practice Munn & Co., 361 Broadway, New York. according to the best methods of investigation, and the proper selection of the objects of study and obtaining the most complete information in regard to them. It gives'preservative and macerating fluids, dyes, fixatives. mounting media, methods of embedding, etc., with de scriptions of the different instruments used and comparisons of their respective advantages.

# Business and Personal.

A broom holder has been patented by 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 as early as Thursday morning to appear in next issue.

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The Knowles Steam Pump Works, 44 Washington St., Boston, and 93 Liberty St., New York, have just is-sued a new catalogue, in which are many new and improved forms of Pumping Machinery of the single and duplex, steam and power type. This catalogue will be mailed free of charge on application.

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Wood Working Machinery. Full line. Williamsport Machine Co., "Limited," 110 W. 3d St., Williamsport, Pa. Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 46 Hercules Lacing and Superior Leather Belting made by Page Belting Co., Concord, N. H. See adv. page 46. Planing and Matching Machines. All kinds Wood Working Machinery, C. B. Rogers & Co., Norwich, Conn. Iron and Steel Wire. Wire Rope, Wire Rope Tramways. Trenton Iron Company, Trenton, N. J.

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Hoisting Engines. D. Frisbie & Co., Philadelphia, Pa. Tight and Slack Barrel Machinery a specialty. John Freenwood & Co., Rochester, N.Y. See illus. adv., p. 62 English tanned Walrus Leather, Sea Lion, Oak, and Bull Neck Leather for Polishing. Greene, Tweed & Co., New York.

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#### HINTS TO CORRESPONDENTS.

- HINTS TO CORRESPONDENTS.
  Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.
  References to former articles or answers should give date of paper and page or number of question.
  Inguiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.
  Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.
  Scientific American Supplements referred to may be had at the office. Price I0 cents each.
  Minerals sent for examination should be distinctly marked or labeled.

(1) P. H. desires a stain to imitate cherry. A. Rain water 3 quarts, annatto 4 ounces; boil in a copper kettle till the annatto is dissolved, then put in a piece of potash the size of a walnut; keep it on the fire about half an hour longer, and it is ready to bottle for use.

(2) W. C. writes: In making a red or yellow stain with dragon's blood or turmeric, I want to tone these colors with a black, soluble in alcohol. A. You can probably purchase an aniline black that is soluble in alcohol, or else use logwood.

(3) F. F. K.-Old zinc battery plates can be melted in an iron pot and cast into plates in moulding sand, or may be cast in an ironmould. Zinc melts just below a red heat. If the zincs have been amalgamated, you should avoid inhaling the fumes rising from the heated metal.

(4) J. W. B. desires a recipe for some fe-extinguishing liquid. A. One of the best solutions for the extinction of incipient fires consists of crude calcium chloride 20 parts, salt 5 parts, dissolved in water 75 parts. Keep at hand, and apply with a hand pump.

(5) E. E. G. asks how to make a leaf bluing. A. Use unsized paper and any of the following solutions: 1. Dissolve indigo sulphate in water and filter. 2. Dissolve good cotton blue in cold water. 3. Dissolve Prussian blue with one-eighth part of oxalic acid in water. 4. Dissolve Tieman's soluble blue in water with 2 per cent oxalic acid.

ed by Messrs. William E. Davies and William C. Gay ley, of Deringer, Pa. This invention consists in making the thills in two parts hinged together, with a spring attachment, to neutralize or overcome "horse motion," and relieve the horse to some extent of the weight upor his back

A belt punch has been patented by Messrs. Henry Bouchy and J. Henry Bamberger, of Newark, N. J. It has pivoted lever jaws, with a sliding tool in each handle end, and a revolving head carrying cutting devices on one of the jaws, with a rotary disk provided with punches, making a strong, cheap, and convenient tool

A metallic bayonet scabbard has been patented by Mr. James McKenney, of New York city. It is made with an outwardly projecting flange upon the angularside of its upper end to overlap the edge of the throg, in such manner that the connection between the scabbards and the throgs will be firmer and more secure than with the ordinary construction.

A bellows has been patented by Mr. Jacob F. Weitzel, of Cincinnati, Q. It is intended more especially for bee smoking, and comprises main plates of sheet metal bent at their edges, forming

#### Received.

THE SCIENCE OF MIND APPLIED TO TEACHING (According to Phrenological Methods). By U. J. Hoffman. New York: Fowler & Wells Company.
 TECHNICAL VOCABULARY, ENGLISH AND GREMAN. By F. J. Wershoven and A. Van Kaven. Leipzig: F. A. Brockhaus.

THE PANAMA CANAL: ITS HISTORY, POLITICAL AS-PECTS, AND FINANCIAL DIFFICULTIES. By J. C. Rodrigues. New York: Charles Scribner's Sons. WYORK AGRICULTURAL EXPERIMENT STATION: Third Annual Report of the Board of Control, for 1884. Albany, N. Y.: Weed, Parsons & Co. IOWA STATE BOARD OF HEALTH: Third Biennial Re-port, for fiscal period ending June 30, 1885. Des Moines: George E. Roberts.

Conspiracy. A Cuban Romance. By Adam Badeau, New York: R. Worthington.

FARMER'S VIEW OF A PROTECTIVE TARIFF. By Isaac W. Griscom. Published by the author, Wood-bury, N. J. Broadway, New York City, N. Y.

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

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Supplement Catalogue.-Persons in pursuit of information of any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCI-ENTIFIC AMERICAN SUPPLEMENT sent to them free. The SUPPLEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York. Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. Guild & Garrison's Steam Pump Works, Brooklyn, N. Y. Steam Pumping Machinery of every description. Send for catalogue.

Cable Roads. Duplicate system. D. J. Miller, 234

(6) A Subscriber asks how to make spirit varnish suitable for varnishing carved wood. A. Take 1 ounce copal and % ounce shellac; powder them well, and put them into a bottle or jar containing 1 quart alcohol. Place the mixture in a warm place and shake it occasionally until the gums are completely dissolved; and when strained the varnish will be ready for use

(7) C. J. C. asks: What is cut glass, such as is sold by dealers? A dealer here has two berry dishes that look alike, prices \$1.00 and \$20.00. One he calls cut glass and the other an imitation, with rough surface. A. Any glassware that has been ground in facets and repolished is cut glass. The kind that you sketch is very expensive when cut.

(8) W. A. E. asks how India ink (liquid), such as is sold in the art supply stores, is made. A Dissolve shellac in a hot aqueous solution of borax and rub up in this solution a fine quality of India ink. Or rub down genuine India ink with good black ink until it will flow easily from the pen. See ink erasers, in article on inks, in SCIENTIFIC AMERICAN SUPPLEMENT, No. 157.

from which he can get one or two dozen castings in tin or its soft alloys. A. You may make a mould of two or three minutes, but, by lifting up the trap (strainer), 3 inches. A. The additional steam drum will not help iron or brass for casting tin or soft alloys. Plaster of the water bubbles up two or three times and then runs Paris moulds will allow of a few castings, but are down all right. What is the trouble? A. The sink brittle and not reliable. If the mould can be cut easily, it can be made of soapstone

(10) W. V. L. asks: Is it true that gold is one of the constituent parts of silver? A. Both gold and silver are elements, and theoretically are free from all admixture. In commerce they are generally alloyed with some harder elements, In mining, gold ore often yields a good proportion of silver.

(11) J. M. L. G. asks: 1. What is about the cost of the least complicated and plainest (and therefore the cheapest) lathes in the market? Also planer of the same description. Both to be durable and strong, for working iron. A. The price of lathes and planers varies so widely that it is impossible to name a price without knowing the size. A new or second hand lathe for iron work may be anywhere from \$50 to \$500. Planers about the same. Address makers and dealers who advertise in our columns for their lists of new and second hand machinery, stating about the size you want. 2. Is it injurious to slightly oil or grease boilers at night when Quitting work? A. There is no harm in oiling the outside of your boiler. 3. Bo the safety plugs (in the crown sheet) ever melt out when properly filled with metal, when well covered with water? A. Safety plugs have been known to melt piece of rag, rubbing it well in and then drying. by too hard firing with a thin sheet of water over them. Otherwise they are generally reliable.

part of the dues are taken in labor. We do not know of any institutions that provide for students wholly have saved, some knowledge of the machinist's trade, about as thorough a course as you may resolve upon.

(13) M. I.—Lignite may be readily pressed in bricks for burning, by the addition of a little tar or the destruction of the earth follows by analogy fluid pitch or asphalt. Crude oil does not dry readily. and might not be found practicable. Presses for this work are made in Pennsylvania.

(14) G. E. B. asks: Of what value would a knowledge of the process of hardening copper be to any one at the present time? A. Such a process would been worked to shape or combined with other metals. as the linings of pump cylinders, hydraulic rams, and pistons, and for a thousand uses in running machinery. The hard alloys of copper are well known.

(15) F. W. asks the simplest way to tell how much a block and fall will safely carry. Also, how many men it would take to lift a certain weight with a 2 and 3 sheave block, and the difference with 3 and 4 sheaves and blocks; also, if ropes are oil, stirring all the time to dissolve completely. Boil measured round or through, and if there is a book on ropes and knots. A. With a pair of blocks of 2 and 3 sheaves respectively, you will have a leverage of 5 to 1, less the friction. With a pair of blocks of 3 and 4 sheaves respectively, the leverage will be 7 to 1, less the friction. New ropes will bear from 1,500 to 2,000 with alkanet root. pounds as a safe load per square inch of section. A rope of 1 inch diameter will have 34 of an inch section and may be used for from 1,200 to 1,500 pounds load. Ropes are sold by their size in circumference. Thus a 3 inch rope is 0.95 inch diam $_{\rm 6}$ ter. A 216 inch rope will be a little over ¾ inch diameter, etc. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 396, Rope Strains.

(16) T. H. G. writes: I have a mahogany table which has been varnished and has ink spots on it. 1. By what means can I get the varnish and ink off, in order to rub on an oil finish? A. The ink spots can be washed off with water and the varnish with Polish with rotten stone and oil. alcohol, or spirits of turpentine. 3. What will remove water stains from hibit greater friction, as these features are exaggerated. polished marble ? A. Mix quicklime with strong lye, so as to form a mixture having the consistency of cream, and apply it immediately with a brush. If this composition be allowed to remain for a day or two, and be then washed off with soap and water, the marble will appear as though it were new.

(17) F. A. C. desires a receipt for a haress cleaner and oiler. A. Take 2 ounces mutton suet, 6 ounces beeswax, 6 ounces powdered sugar candy, 2 ounces soft soap, and 1 ounce indigo or lampblack. Dissolve the soap in 1/4 pint of water. then add the other ingredients, melt and mix together, add a gill of turpentine, lay it on the harness with a sponge and polish off with a brush.

of glue, applied hot to wood or articles of a woody the iron while the boiler is in use, but may make a (18) C. H. B.-The coarse emeries are nature, would permeate the material, giving it toughsifted. You may buy sieves of brass for grades down ness and rigidity, or would said glue remain as a to No. 80 or 90. After that, wash by placing the mere coating, not permeating? If the glue would not troublesome to clean off. When the boiler is not in emery in a basin, pail, or tub, according to the quanmaterially permeate, what would you suggest as a tity you wish to wash, with a small pipe attached to fluid that would permeate and produce rigidity and, at A close examination of the rear end of the boiler and a hose from a water supply, and a faucet to regulate fluid that would permeate and produce rigidity and, at the flow; stir the emery at the bottom of the pail the same time, have a preserving quality? It is dewith the hose nozzle, allowing the water and fine sired that the article should be very cheap and the emery to run over the side of the pail into a pan, process very simple. A. Glue will not penetrate wood sufficiently to affect its stiffness or rigidity. Boiling larger than the pail, and, if necessary, continue the the articles in thin glue for a few minutes will allow overflow into two or three pans. The different pans the glue to penetrate slightly further than the mere will catch different grades of emery. Your own brushing of the hot glue upon the surface. Whatever judgment and a little tact must be used in regulating can be forced through the grain endwise, that would the flow of water. dry easily and of a glutinous nature, would stiffen the (19) L. S. P.-Height of Washington work. These processes are tedious and expensive. monument, 555 feet. The depth that a body sinks in (27) J. M. D. asks: Is there any virtue sea water depends upon its density. Sea water weighs 64'312 pounds to a cubic foot, while fresh water in the "divining rod," so called, as a means of deterweighs 621/4 pounds to a cubic foot. From this a mining the locality of hidden streams of water? A. comparison of the floating capacities may be estimated. None whatever. The bobbing of the stick is due to a nuscular pressure by the holder. • All bodies heavier than water go to the bottom at once, even to the greatest depths. The greatest depth (28) T. E. writes: I have a marine yet reached is about 23,000 feet. See SCIENTIFIC boiler in use on a steamboat that gives plenty of steam, AMERICAN SUPPLEMENT, No. 398, for illustration of but the motion of the engine (12 inches in diameter, 5 deep sea sounding apparatus. 6,000 to 10,000 pounds | feet stroke) raises the water in said boiler at least 4 per square inch is the greatest hydraulic pressure we inches. There is a steam drum on top of boiler about have heard of being used; 4,000 to 6,000 pounds per 18 inches diam. and 24 inches high. Would an addi-tional steam drum connected horizontally to top of toilet soap. A. See "The Manufacture of Toflet square inch in common use. (20) C. B. writes: 1. I have an iron drum now on boiler, with a three inch pipe, prevent wash sink with a common trap and % inch waste pipe the raising of water when the engine is in motion? If MENT, Nos. 518 and 519.

pipe is air bound, and the bubbling is caused by air escaping. The pipe should be ventilated between the trap and sink; vent should be outdoors. 2. What is sweet oil made of? A. Sweet oil is the oil of the olive, which grows in Spain, Italy, etc. 3. What is celluloid? A. The manufacture of celluloid, parkesine, and zylonite are described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 227. 4. Does the word "Redditch" on needle labels stand for the maker's name? A. Redditch is a trade mark. You may obtain prices through the jobbing trade in your city.-The sample you ask about is called pebble cloth, made by passing it through embossed calenders. Mastic varnish is proper for it.

(21) W. B. H. writes: Have you a recipe composed of linseed oil and resin, mixed, to make ner, which, in less than a year's time, will compel me muslin semi-transparent and waterproof? A. Dissolve to get another new ram, unless the evil is remedied together white resin pulverized 8 ounces, bleached linseed oil 6 ounces, white beeswax 11/2 ounces; add the turpentine while hot. Apply to both sides of the cloth is not filtered; but if the cause was from sand or any while it is stretched tight. 2. How are the yellow gritty substance, it surely would ruin the leather packoil proof coats made? A. The yellow jackets referred to are made by treating the cloth with a solution made by dissolving 1 ounce beeswax in 1 pint best linseed oil over the fire, applying it, when cold, with a

(22) S. G. W. writes: Sam Jones, the noted revivalist, is trying to make people believe that (12) A. E. L.- Oberlin College, Ohio, 13 worlds have been lost sight of by the astronomers Cornell University, Ithaca, N. Y., are institutions where and it is a sure sign that one world or planet will part of the dues are taken in labor. We do not know soon be destroyed. Give your opinion. A. We do not think it follows that the stars referred to have been earning both board and tuition, but with the \$300 you destroyed because they have been lost sight of. Astronomy cites many instances of stars appearing in the and plenty of pluck, we do not doubt you can get heavens attaining a high magnitude and then suddenly 2. Could I bake in a japan oven so that the transferred disappearing again. In some cases these phenomena have been observed to be periodic. We do not see that

(23) J. J. W. asks: 1. The ingredients for a good water stain to imitate walnut? A. Burnt umber 2 parts, rose pink 1 part, glue 1 part, water sufficient; heat all together and dissolve completely; ap ply to the work first with a sponge, then go over it with a brush, and varnish over with shellac. 2. A good be very valuable if it can be done after the copper has jet black water stain. A. Pour 2 quarts boiling water over 1 ounce of powdered extract of logwood, and when the solution is effected 1 drachm of yellow chromate of potash is added and the whole well stirred. When rubbed on wood, it produces a pure black. 3. A good size for gilding with gold leaf, one to be ready for gilding in an hour. A. Good drying oil 1 pound, pure gum anime powdered 4 ounces. Bring the oil almost to the boiling point in a covered metal pot, add your gum gradually and cautiously to the toa tarry consistency and strain, while warm, through silk, into a warm bottle with a wide mouth. Keep it well corked; use as required, thinning with turpentine. 4. The compositition of the so-called oil finish? A. Boiled linseed oil 1 pint, yellow wax 4 ounces; melt and color

(24) H. N. S. asks:"Which is the fastera toboggan or a sled (steel shod); assuming that the total weight is the same in each case, the incline of the coast the same, and each on a coast best adapted to it? Also, the reasons governing your reply. A. We should say the steel shod sled. Although the frictional resistance is independent of the area of contact (so much larger in the toboggan than in a sled) or the velocity of rubbing, and the intensity of pressure is the same, yet the rubbing surfaces of the toboggan present more asperities to interlock with those of the ice or snow than do the steel runners of a sled. Bodies havalcohol. 2. What is best to polish carved brass? A. ing rough surfaces, those made of compressible material, and those of irregular surface and form ex-

> (25) N. N.—Art work is so various in its specialties that we cannot venture on specific names without knowing what you should know, viz, what your taste leans to in art study. When a young man arrives at the age suggesting a feeling of responsibility, he should at once consult with his friends or those that know his habits, opportunities, and proclivities, as to the probability of his success in any trade or art that presents itself to his grasp. We believe that you have an excellent library in your town in which are to be found books on the trades and arts. Join it and read.

(9) F. C. E. asks how to make a mould | leading to a cesspool in yard. When water is thrown in so, how large a drum would be necessary? Would the sink, it does not run off readily; a pint would take this additional drum save fuel? My steam pipe is you. It will only add to the work of the boiler by condensing the steam. If your steam pipe and drum is naked, it should be felted. The raising of the water is, no doubt, a surging of the surface into waves by the action of the engine, which shows in the water gauge. This may be partially prevented or broken up by making another connection near the end of the boiler, between the boiler and the steam pipe, with a 2 inch or 21/2 inch pipe. This will partially relieve the water under the dome from the reciprocating action of the engine. Felting the exposed parts of the boiler is also necessary to economy.

> (29) L. H. R. writes: In a hydraulic ram for making lead pipe the water ram is eaten with grooves running vertically with the ram. This cause thewater to leak so badly. I had a new ram cast. now notice small grooves beginning in the same man What is the cause? What is the remedy or prevent ive? The water used is from the Kansas River, and ings before it would eat away the ram. A. The ram pistons in the lead pipe presses in New York and vicinity have a life of only about one year, wearing in grooves as you describe. The present practice is to cover the pistons with copper, which wears two to three years. Old pistons are also covered and recovered. If you have the old piston, you can have it covered. Gritty substances, as fine sand, iron rust, the hardening of the leather by absorption of iron. together with the great pressure, is the assigned cause of the cutting.

> (30) C. R. desires a simple size for making decalcomanie or transfer paper. A. Use gelatin size. printing could be drawn slightly, like a blacking box lid? A. If the picture is coated with a transparent japan varnish, it can be baked same as any other varnish. If the japan is quite thin, the metal may be drawn

(31) H. L. writes: 1. I wish to melt a gold coin in a sand crucible, and want instructions how to proceed. A. Break into small pieces, mix with borax, and expose it in the crucible. 2. Is there danger of heating too hot? A. No. 3. Can I remedy its tendency to crack ? A. Only by proper annealing. 4. I have seen gold coin as yellow as brass and some almost as red as copper. What is the cause of so much difference in color? A. The red color is due to its being alloyed with copper. The natural color is yellow, but it becomes red by the addition of copper. See "The Practical Gold Worker," by George Gee, which we can send for \$1.75.

(32) J. G. H.-We could not recommend a steam pump to be used once a fortnight. It would never be in order for running. A small low pressure steam pump in the market will cost about \$125. We consider gasoline a dangerous element in its liquid state, in the vicinity of fire. Its vapor, mixed with air, as used for lighting purposes, where the vaporization is carried on outside of the premises, will be safe if burned in jets in a stove.

(33) J. C.—A first class ice boat, sailing on first class ice, will sail from three to four times faster than the wind that drives the boat. For example, a wind having a velocity of fifteen miles an hour will drive the boat at the rate of from forty to sixty miles an hour

(34) W. H. O. desires a formula for making white miners' oil, for burning in lamps. A. Take 50 to 60 per cent mineral, seal, or some other 300° oil and from 40 to 50 per cent of pure lard oil. A cheaper article is made by using 40 to 50 per cent cotton or rape seed oil.

(35) E. W. asks: What is a good, cheap substitute for beeswax to coat wooden patterns for nse but a few times, something that can be applied with a brush, without heat? A. Shellac varnish. 2. What is a good flux for welding iron in a blacksmith's fire, and the desirable qualities of coal for same? A. Clear white sand or borax. Use best Cumberland coal, free from sulphur

(36) J. C. writes: I am burning in my boiler slabs that are saturated with salt water, and find that the tubes of the boiler have to be cleaned out every few days on account of the salt, which is coated heavily upon them. Is there any danger of the salt eating into them or doing any injury? A. The burning (26) C. R. asks whether successive coats of salt fuel under boilers may not materially affect coating or form a coat upon the surface of the tubes by the condensation of the evaporated salt that will be use, the salt crust will absorb water and rust the tubes.

(39) P. M. A. asks: Would you please e some remedy whereby tattoo marks may be completely expunged? A. We know of no means by which they can be completely removed. Pricking in milk, in ome cases, rather fades them.

## INDEX OF INVENTIONS

#### For which Letters Patent of the **United States were Granted**

#### January 12, 1886,

#### AND EACH BEARING THAT DATE.

h 1	[See note at end of list about copies of these pat	ents.]
I -	Abrading machine, C. K. Bradford Acid, apparatus for distributing, etc., liquid car-	
е	bonic, Convert & Rueff Acid, manufacture of salicylic, R. Schmitt	334,351 334,290
- 1	Aging spirituous liquors, wines, etc., apparatus for, H. A. Fitch	334,222
y	Air brake for railway cars, electro-magnetically operated, H. Hollerith	334,022
1	Air compressor, L. S. Chichester	334,153
'n	Air or gas engines, operating, G. H. Babcock Air or gas engines, operating, G. H. Babcock Animal trap, W. E. Maultby	334,154
0	Animal trap, G. F. Voester Automatic brake, J. T. Honeycutt	334,096
- t	Axle box, car, W. Sutton Bag and twine holder, combined, J. Duls	334,205
,	Bagasse furnace, W. W. Sutcliffe Baling press, P. K. Dederick	334,005
e	Barrel filler, J. McKenzie. Bellows, J. F. Weitzel.	334,319
-	Belts, slide for sword, F. T. Buffum Bicycle, J. L. Yost Bicycle seat, C. M. Clarke	334,325
1	Billiard chalk holder, W. Zaehringer Block. See Hat fimshing block. Pulley block.	
t.	Sawmill head block. Boiler. See Steam boiler.	
e	Book rest and stand, folding, Walker & Crayton	334,313
L.		334,361
v h	Boot or shoe creeper, L. C. Hoffmeister	334,162
e 7	Bottle stopper, R. Bloeser Bottle stopper fastening, H. P. Brooks	334,334
e	Bottling machine, W. F. Dorflinger Box See Cash box Folding box	334,857
1	Bracket. See Easel shelf bracket. Brake. See Automatic brake.	
,	Brick drying structure, J. K. Caldwell Bridge gate, automatic draw, W. S. Morton Bridle blind, A. F. Ransom	334.084
1	Bridle, harness, M. R. Good Broom corn, compound 'for softening and dyeing,	334,168
1	J. A. Van Winkle Broom holder, J. F. Barringer	<b>334,</b> 214
•	,	
:   1 1	Brush making machine, J. M. Pickering	334,086
-	Bustle, A. M. Belden	334,332
ן ו	Button or stud, T. B. Cleveland Button setting machine, Wilkins & Bartlett	334,349 334,321
	Cable grip, roller, G. A. Polhemeus (r) Calculating machine, E. W. Watson	334,064
	Can counting machine, E. Norton Can delivering device, automatic, E. Norton Capsule machine, J. Krehbiel	834,274
	Car coupling, M. Dill.	334,855
	Car coupling, L. B. Kenney Car starter, C. F. Dodge	384,111
	Cars, street indicator for, Beaver & Jewitt Carbons, apparatus for treating, E. Weston Carpet fastener, F. C. Hellmuth	334,146
ا	Carpet stretcher, Keller & Wiley. Carpets, etc., fastening for, D. M. & J. E. Smyth	384,174
	Carriage, baby, J. W. Griffin Carriage, baby, J. R. Moore	334,030
;	Cash box, self-registering, T. Carney Cast wheel, pulley, etc., M. D. Loomis	334,178
	Casting box, stereotype, Pratt & Partridge Casting stench traps, mould for, E. H. Murdock Chair. See Spring chair.	
	Chair. See Spring Chair. Chair, J. W. Price Chimneys on burners, device for holding and lock-	834,087
	ing, J. R. Bowers Churn, W. Jarrell	384,229
	Cider machine, M. K. Brubaker Circuit changer, automatic, E. T. Gilliland Clamp. See Sucker rod clamp.	
	Clamp. See Sucker rod clamp. Clamping device, spring, I. W. Heysinger Cleansing machine, T. H. Page	
ļ	Clip. See Traveling bag clip. Clock escapement, C. Becker, Sr	834,068
	Clock gong and bell, G. Gardner	334,379
	Cock box, stop, B. C. Smith Collar fastening, horse, Gillespie & Cassan Colors, manufacture of archil-red azo, C. A.	
	Martius Connecting rod, bearing pin, L. H. Nash	
1	Connecting rod for pistons, etc., L. H. Nash Cooling and disinfecting apparatus, L. H. Lati-	
	mer Cork extractor, Tobias & Shoesmith Corset, K. Dunham	334,061
	Counter and show case, combined, S. B. Dooley Coupling. See Car coupling. Detachable coup-	
	ling. Hub and axle coupling. Coupling joint, B. F. Sweet	
1	Cuff holder, F. E. Kohler Cultivator, S. L. Allen Cultivator, M. F. McCray	834,327
İ	Cultivator, W. C. Peters	
	Desk and seat, combined adjustable, A. B. Irvin.	334,256
ĺ	Door attachment, sliding, W. Spear	334,344
	Draught equalizer, J. L. Powles Drum, heating, M. N. Kimble Dyed, machine for condensing warps for being, I.	
ļ	F. Lawry	34,065
i	Eaves trough, W. C. Berger	3.34 <b>,9</b> 80
1	Electric light, multiplex, A. C. Ferguson S	x+1,300

tubes will show whether the tubes are accumulating a crust that the tube brush does not remove. If so, better abandon the use of salt fuel. The dry salt does not affect the iron. The salt absorbs water when the boiler is cold, when rust takes place.

(37) J. S.-Cast or tool steel cannot be welded together with any certainty. Low grade steel that will harden, such as shear and double shear, can be welded together fairly with borax and sal ammoniac or borax alone, which are also good for welding steel to iron. Use about one-tenth sal ammoniac, pulverized with the borax and heated to evaporate the water, then pulverize again and weld with the powder.

(38) E. M. asks (1) what to add to hair oil that will give the hair a vellow color. I have very light hair, and would like to color it a darker shade. A. A bismuth hair dye is described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 356, which is not considered injurious at all to the head. 2. Give me a remedy to purify the blood. A. We would refer you to a Soaps," contained in SCIENTIFIC AMERICAN SUPPLE-