ENGINEERING INVENTIONS.

A balanced stop valve has been patented by Mr. William Jackson, of Allegheuy, Pa. Combined with a casing having an internal circular seat open at top and bottom, with opposite openings in its sides, is a tubular valve or plug with openings in its bottom, top, and sides, with other novel features, making an equal pressure on all parts of the valve, so that little power is required to turn the plug.

A piston packing has been patented by Mr. William C. McTyeire, of Hatchechubbee, Ala. This invention covers special forms of springs and presser plate seated within the piston head to make a packing to adapt it to the wear of the cylinder, so as to always form a steam tight joint, and one differing from the ring sections and sectional rings heretofore used.

AGRICULTURAL INVENTIONS.

A corn planter and drill has been patented by Messrs. Edgar V. and James V. Mitchell, of Martinsville, Ind. The construction is such that by the revolution of a flanged wheel, secured to the hub and to a driving wheel, the seed slide is carried to the right and left, dropping the grain twice in the revolution of the wheel, and there are four or more changes for the drill instead of two.

A corn harvester has been patented by Mr. Edward W. Comegys, of Edesville, Md. Saw toothed blades are hung on arms near the ground, and extend back diagonally to the line of travel to cut off the stumps of corn stalks near the ground, and so that a person on the machine can control the cutting and gathering into bundles of the corn and stalks of two rows while passing once between them.

MISCELLANEOUS INVENTIONS.

A button fastener has been patented by Mr. Charles F. Harlan, of Ottumwa, Iowa. It is formed of a single piece of wire, with an eye to receive the eye of the button, while the form is such that eye or other buttons may be attached thereby to a garment without stitching.

A stem winding watch has been patented by Mr. Leo Aeby, of Madretsch, near Bienne, Switzerland. This invention covers a novel construction for simplifying the manufacture of such watches, by dispensing with the bridge, a nut and screws, and giving some other parts double functions.

A medical compound as a remedy for rheumatism has been patented by Mr. John R. Barr, of Union Star, Ky. It consists of apple brandy, star root, gum guaiacum, nitrate of potash, and prickly ash berries, compounded in certain proportions and used as stated.

An organ action has been patented by Mr. Jarvis Peloubet, of Bloomfield, N. J. The invention consists, in connection with the reed chambers, of valves and a rod for actuating them, and movable in line with its length, the arrangement being such that the reeds can be easily withdrawn for tuning.

A metal eyelet or button hole has been patented by Mr. Thomas B. Ashford, of Clinton, N. C. It is formed of a hollow disk and a face plate, between which is arranged a spring catch of peculiar construction to lock under the button head, the device being especially applicable for leather carriage curtains, to counteract the effects of wear and shrinkage.

A folding barrow truck has been patented by Mr. Joseph W. Coleman, of Schooley's Mountain, N. J. It is so made that the side bars may be folded together, and that movable bottom and side pieces may be added, to make a wheel barrow, or for use as a baggage truck, which can be folded in very small space.

An exercising chair has been patented by Mr. Joseph M. W. Kitchen, of New York city. The seat and pedestal are connected by two shafts, two pairs of standards and their rollers, slotted bars to receive the rollers, and operating handles to give an up and down movement to the chair seat, there being springs interposed to equalize the motion.

A hame fastener has been patented by Mr. Henry R. Robinson, of Golden, Col. It consists of a bar plate, a hook plate, and a locking and releasing lever, of novel construction, particularly adapted to secure the lower ends of hames to the collar of a draught animal, but applicable as a saddle girth fastener, or for other analogous uses.

A method of working button holes has been patented by Mr. Sherwood B. Ferris, of Lakewood, N. J. It consists in arranging a series of detached pieces of fabric at suitable distances apart to form the sides of the button holes, and uniting such pieces by a binder stitched to hold them in their spaced positions, and to close each button hole at the ends.

An adjustable panel snow fence has been patented by Mr. Rollin H. Gleason, of Egan, Dakota Ter. The panel is erected at the top of a cut, so that when the wind blows toward the cut it strikes a vane bringing the panel into such position that the wind will clear the snow out of the cut, the device working automatically.

A clothes drier has been patented by Mr. Benjamin F. Buxton, of Brookfield, Vt. Combined with standards is a vertically sliding plate, with arms pivoted thereto and bars pivoted to the arms, clothes being placed on the bars when the plate is lowered, when the plate is raised by a rope and pulley, and locked in position by fastening the rope to a cleat.

A ratchet drill has been patented by Mr. Isaac D. Weaver, of Lebanon, Pa. It has a stop, with different angles, so arranged that the stop may be adjusted to project in opposite directions from the casing in order to engage the work, and prevent the casing from revolving, the angular socket permitting each point to be placed therein in a variety of ways.

A folding dish drainer has been patented by Mr. Fred Eaton, of Conway, N. H. It is formed of two pairs of crossed standards united at the intersections and at the outer ends, with wires extending from the rods connecting the outer ends of the standards with the rod uniting the same at the intersections, to hold dishes upright to drain off the water, and folded compactly when not in use.

A rope reel has been patented by Messrs. William M. Kizer and Charles W. Clink, of Winfield, Mich, It has connected end frames with radial slots, rotatable disks mounted next the end frames with cam or eccentric slots, and cross rods entering the radial and eccentric slots, so that upon turning the disks the rods may be expanded to tighten within the coil of ropes.

A regenerative gas burner has been patented by Mr. Eilert O. Schartau, of Philadelphia, Pa. It has a hood above the top of the chimney to concentrate the heated air and products of combustion in a trumpet mouthed tube, causing a screw to revolve and draw in a current with the blaze, making an intense heat, expanding the gas, and promoting thorough combustion, with other novel features.

A cloth guide for fulling mills has been patented by Mr. Thomas Kitson, of Stroudsburg, Pa. It is made of glass or porcelain, whereby wear and friction are reduced, and the guide presents rounded surfaces exposed to the cloth, being inserted within the usual perforated guiding face, whereby the guide is protected from injury, and may be readily detached and replaced.

A whiffletree coupling has been patented by Messrs. Frank D. Warner and William J. Matthews, of Collinsville, Ill. Combined with the double tree and single tree are a staple, half staple, and clip with a quarter twist, it being designed that thereby the single trees will be supported in the same horizontal plane with the double tree, even when the draught strain is removed.

A sash holder has been patented by Mr. Albert Ayers, of Rahway, N. J. Combined with a socket and a plug held outward by a spiral spring is a screw designed to prevent the inner end of the plug from being pushed from the socket when the sashes are taken out of the casings, the device being adapted for car, carriage, or house windows, to prevent rattling of the sash.

A deodorizing and disinfecting apparatus has been patented by Mr. William A. Hawkins, of New York city. It consists principally of a measuring device connected with two tanks in which are placed water and undiluted deodorizing material, the latter to be diluted with water in the measuring device preparatory to being used in the receptacle to be deodorized or disinfected.

A writing machine for the blind has been patented by Mr. William H. Perkins, of Owensborough, Ky. This invention provides a machine for writing more rapidly in embossed characters, by puncturing sheets of paper, than can be done with the usual hand slate and stiletto, and so that the embossed characters will be formed in the order in which they are read, in accordance with the code of characters.

A ladder and fruit conveyer has been patented by Mr. George W. Moore, of Dunedin, Fla. The conveyer is attached to the ladder, and consists of a box with alternate inclines and openings in its front, through which the fruit is passed, and an inclined apron near the bottom, so that the fruit can be conveyed without injury to the ground from any part of the ladder.

A flooring board has been patented by Mr. John R. Baldwin, of Montgomery, Ala. It has both its under and upper side dressed, so that shrinkage will be equal on both sides, and has longitudinal concave shaped recesses in its under side of approximately the same area as the area of its upper side, making air spaces which assist in preventing dry rot, and lightening the weight.

A dial for time pieces has been patented by Mr. Henry W. Oliver, of New York city. It is a compound dial having a main inner stationary dial with one set of numerals, and a forwardly and backwardly turning outer dial, one dial indicating one-half of the day and the other the other half of the day by means of certain automatic attachments, to indicate standard time in clocks and watches.

NEW BOOKS AND PUBLICATIONS.

MOULDER'S TEXT BOOK. By Thomas D. West. New York: John Wiley & Sons.

This work, though an independent volume of 450 pages, forms part ii. of "American Foundry Practice," by the same author, who is a practical iron moulder and foundry foreman. It presents original methods and rules for obtaining sound, clean castings, and gives detailed descriptions for making those more difficult moulds which call for the best skill and experience. The book also presents some practical considerations on the construction and operation of cupolas, and the melting of iron and scrap steel in foundries, with forty-six reports of cupola workings in different States, giving the experience of founders in mixing and melting iron, and the comparative economy of various methods of working cupolas.

A TEXT BOOK OF THE MATERIALS OF CONSTRUCTION. By Robert H. Thurston. New York: John Wiley & Sons.

This volume of 700 pages is an abridgment of the author's former work in three volumes on the "Materials of Engineering," and is intended more particularly for use in technical and engineering schools, the author having used a good portion of the work here given in the instruction of classes in mechanical engineering.

THE PAPER MAKERS' DIRECTORY OF ALL NATIONS. By S. Charles Phillips. London: The *Paper Makers' Circular*.

The list of paper makers in the world forms a handsome volume, the United States heading the list with 1,122 mills, after which come Germany with 1.037, France 512, Austro-Hungary 378, England and Wales 287, Italy 194, Russia 148. The total of the mills in the world is 4,896.

STORIES OF INVENTION, TOLD BY INVENTORS AND THEIR FRIENDS. By Edward E. Hale. Boston: Roberts Bros. 1885.

In his preface, Mr. Hale recalls the legend of the old Public Library at Dorchester, which was only opened on Saturday, and where the nsual message brought by the little people to the perplexed librarian was that "Mother wants a sermon book and another book." To decide what this "other book" shall be is largely the purpose of the series of which the present volume is the fifth and concluding number. It is a series intended to give young people hints about their reading. These suggestions come very pleasantly from the lips of their old friend Mr: Frederick Ingham, or Uncle Fritz as he is commonly called, whose various travels and adventures are pretty thoroughly known to old and young people all over the land. The club of five and twenty nieces and nephews who gather around Uncle Fritz at Lady Oliver's honse, near Boston, have been instructed according to Emerson's rule, "Read in the line of your genius," and have, in deference to the varied talents of their members, considered successively the tales of soldiers, of sailors, of adventurers, of discoverers, until now they meet to read np the lives of inventors. With the aid of the chief in the arm chair, they make out a number of very interesting stories, from Archimedes and the earlier inventors down to Bessemer and Goodyear. They are all attractively told, and will stimulate young people to investigate for themselves the wealth of information stored up in our libraries.

NATURE'S TEACHINGS. Human Invention anticipated by Nature. By the Rev. J. G. Wood, M.A., F.L.S. Boston: Roberts Bros. 1885. Illustrated.

In this volume of analogies, the author has attempted to show that there is scarcely a single invention of man which has not its prototype in nature, and that the largest results have sprung from apparently the most insignificant means. He traces the origin of our common tools and implements in navigation, war and hunting, architecture, optics, acoustics, and the useful arts generally, to some model in either the vegetable or animal world; and as the moral to his tale, points to the same sources for the inspiration for further achievements. It is a book which shows ingenuity, and is interesting from the glimpses of natural history which it affords.

FOWNES' MANUAL OF CHEMISTRY. A New American from the Twelfth English Edition. Embodying Watts' "Physical and Inorganic" Chemistry. Philadelphia: Lea Brothers & Co.

Professor Fownes' work has long been a standard, and, although there are now more elaborate treatises on every branch of the subject, Fownes' Manual continues to be among the most popular of all books on chemistry. It has been many times re-edited, since the death of the author in 1849, as was absolutely necessary from the changes in chemical nomenclature and the advances in our knowledge of chemistry; but it still maintains the character of an excellent elementary treatise, while being very comprehensive in its scope. With the present edition is also incorporated Dr. Watts' admirable revision, almost amounting to an entirely new work, of the portion on Physical and Inorganic Chemistry. This part of the work fills about one-half of the 1,050 pages in the volume, and affords an excellent introduction to the study of chemistry in 100 pages on physics, followed by the chemistry of the elementary bodies and the chemistry of the metals. The book has an excellent index, and is published at a comparatively low price.

PARIS IN OLD AND PRESENT TIMES. By Philip Gilbert Hamerton, Officier d'Academie. Boston: Roberts Bros. 1885.

To those who are already acquainted with Mr. Hamerton's writings, and particularly with "The Intellectual Life" or some of his art critiques, it will be quite unnecessary to recommend the present volume, for they will take it for granted that the book cannot be other than interesting. His point of view is habitually unique, for both education and circumstances have made him a spectator rather than an actor in the events of every day life. There is consequently something about his writings which always breathes of a certain intellectual abstraction, though it is never carried so far as to become distasteful. In his treatment of even so apparently a material subject as the topography of Paris, this characteristic is everywhere visible. The account which he here gives us of a city whose history has always been full of cosmopolitan interest, from the days of Julian the Apostate to our own, throws an additional charm over her historic chateaux and modern boulevards. Mr. Hamerton is well qualified to write of Paris, for he has known the city intimately for twenty-seven years, and he has been so fortunate as to cover entirely new ground. He sketches the appearance of the city as it was, when the island of Lutetia carried the Roman nucleus of the modern city, and down to the time when a succession of ambitious princes and an energetic republic have made it of all capitals the most beautiful. The illustrations of the book are well chosen, though the details of some of them are almost too shadowy.

Received.

REPORT OF THE FIRE DEPARTMENT OF THE CITY OF NEW YORK. Giving details of Force and Equipment, and Fires of 1884. By the Commissioners.

NOTES ON THE CHEMISTRY OF IRON. By Magnus Troilius. New York: John Wiley & Sons.

THE WOODS OF THE UNITED STATES: with an Account of their Structure, Qualities, and Uses. By C. S. Sargent. New York: D. Appleton & Co.

THE NAUTICAL ALMANAC AND TIME TABLES, 1886. An Abridgment, with list of United States Lighthouses. New York: John Bliss & Co.

HEADS AND FACES, AND HOW TO STUDY THEM. By Nelson Sizer and H. S. Drayton. New York: Fowler & Wells Co.

THE PHYSICIAN'S VISITING LIST FOR 1886. A Convenient Pocket Book. Philadelphia: P. Blakiston, Son & Co.

Notes & Queries

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.

Inquiries 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 Information requests on matters of personal rather than general interest, and requests for **Prompt Answers by Letter,** should be accompanied with remittance of $1 to $5, according to the subject, as we cannot be expected to perform such service without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Minerals sent for examination should be distinctly marked or labeled.

(1) H. E. P. writes: I have a Leclanche battery of 8 cells, disk form, which has never worked more than 10 minutes at a time. No cleaning will improve it, as the cups are clean inside as well as outside. I think they are not properly filled. Will you please give in the next number of SCIENTIFIC AMERICAN the proportions of the contents of the cups? A. Soak the cells of your Leclanche battery in warm water for several hours. Clean the zinc thoroughly, and refill the porous cells with equal parts of granulated black oxide of manganese and granulated carbon. After filling, seal the top of each porous cell around the carbon rod with pitch, leaving a small aperture for the escape of gas. The Leclanche battery is not adapted to continuous use; a half hour on a close circuit is too long a time for this battery.

(2) J. R. writes: I want to make a small Gramme machine, armature about six or eight inches long. Have you a description of any other construction? A. For a small dynamo, you will find the Siemens machine, described in SUPPLEMENT, No. 161, the best and simplest. It is quite difficult to make a very small Gramme machine.

(3) F. W. T. asks (1) whether flat Norway iron will do in the place of horseshoe magnets in making a small telephone, and will it work without a battery? A. Norway iron will not take the place of the horseshoe magnet, because the permanent magnetism of the horseshoe magnet is necessary to the working of the telephone. 2. Are there any back numbers of the SCIENTIFIC AMERICAN or SUPPLEMENT containing a description of how to make a small telephone that will work for a distance of about half a mile, to work with a battery? If so, what numbers, and what will they cost? A. See SUPPLEMENT, No. 149. 3. What is used in making a telephone battery? A. The battery commonly used in connection with the telephone is that known as the Leclanche battery. See SUPPLEMENT, Nos. 157, 158, and 159.

(4) S. F. E. writes: Please tell us through the SCIENTIFIC AMERICAN the best telephone for us country folks to use, one that we can buy outright and will be durable? A. For short distances, the acoustic telephone answers very well, and is largely used. See our advertising columns for addresses of makers of acoustic telephones. We do not know of any electric telephones that are on sale.

(5) H. S. sends a specimen of a plant for identification. A. The specimen came in altogether too fragmentary a state to make anything out of it. Send us the leaves and flowers carefully pressed, and inclosed between pieces of cardboard, and we will name the plant for you.

(6) J. B.—There is a difference of opinion among mechanical engineers as to the most perfect forms of action of link motion valve gear. There is considerable variation in forms and arrangements among the engineers of England, Germany, France, and the United States, all claiming perfection in their way. We think you will do well to make a thorough study of the work of others as a set off to your own ideas. We recommend: "Link Motion," by Auchincloss, $3.00; "Treatise on Valve Gears," Zeuner, $5.00; "Link Motion," by Burgh, $12.00; which may be had from this office.

(7) G. A. S. asks: How can I tell the temper of a razor when buying same, and also the hardness of the steel? A. Only by actual trial, if you are unwilling to take the guarantee of the manufacturer or dealer.

(8) E. R. asks: 1. Can brass be worked in a drop at all? That is, can it be drop forged, same as iron can? A. Soft brass can be worked very well in a drop press, but not to same extent as hot iron or steel. 2. I was told yesterday by one of your clients that he saw a perpetual motion machine in operation in New York, last spring or early summer, and that the machine would run until worn out unless stopped. Was such a machine exhibited? A. We know nothing of the perpetual motion machine referred to. We do not think a genuine perpetual motion machine has ever been on exhibition in this city.

(9) E. N. P. writes: 1. I have a large quantity of No. 16 cotton covered and No. 36 silk covered copper wire; can I use this in constructing a hand power electrical machine, as described in SUPPLEMENT, No. 161? A. You can use your No. 16 wire to very good advantage in the electric machine referred to, but the No. 36 is too fine. 2. A cheap battery for induction coil described in SUPPLEMENT, No. 160? A. Grenet's battery, or the plunging bichromate battery, described in SUPPLEMENT, Nos. 157, 158, and 159, will answer your purpose. 3. What alterations must be made in the electric machine to use it as a motor? Also, how many cells of battery, and what kind? A. Use less wire on the field magnet, and wind the armature with coarser wire, say No. 16. 4. Can the electric machine be used for nickel or silver plating? If so, what changes must be made? A. It can be used for plating without any change.

(10) M. M. M. writes: I have made a clay contour map. I should like to know of some material with which I can coat it, rubber, papier mache, or something of the sort, with which I can take an impression without first making a female cast in plaster. I want only one impression. A. We think that very thin sheets of gutta percha softened by immersion in warm water will answer your purpose.

(11) R. N. asks: Can you explain why 18 karat gold, being alloyed with silver and copper equal parts, cannot be beaten out into a thin leaf, when each of the above metals can be separately, and the best way of solving the question? A. The behavior of alloys can never be predicted by an examination of the separate metals. An alloy of silver and copper with gold is harder and more brittle than finer gold, therefore cannot be as readily beaten out into leaf.

(12) J. M. A. writes: I wish to put up a short telephone line, using an acoustic (advertised in SCIENTIFIC AMERICAN), and want to know if uncovered copper wire will answer the purpose as well as covered? If not, why not? Does the use of batteries improve the working of such lines, or do they only operate call bells? A. If your wire is well supported by insulators, the uncovered wire will answer a very good purpose. The batteries used in connection with this telephone, we believe, are merely for operating the call bells.

(13) J. C. O'D. asks: If I use two siphons, each having a two inch bore, to empty a large vessel, and allow the discharge end of both to be at the same level, but the elbow of one is 2 feet above surface of water and of the other 20 feet above water surface, from which pipe will most water flow, and from which will it fall with greatest force? A. From the shorter pipe. The friction of the longer pipe will retard the flow of water.

(14) L. D. B. writes: 1. I made an electric motor on the principle of the revolving turntable for store windows; the cores are five-sixteenths diameter wound with 6 layers of No. 16 wire; it works very well. Wishing to make a more powerful motor, I took nine-sixteenths inch iron, wound them with 8 layers No. 24 wire, and used 6 armatures fastened parallel to the shaft in the style of a water wheel. This machine does not equal the first either in speed or power when I use the same battery on each, which is a carbon battery with electropoion fluid in the porous cup. Is it due to the fine wire that it does not work as it should? A. Your difficulty is due to the resistance of the fine wire with which your magnet is wound. If you had wound your larger magnet with the No. 16 wire, you would have succeeded better. 2. What is the limit to the number of armatures that can be used with one magnet? A. We do not know that there is any limit, but we think there is no advantage in a large number of armatures, when used in connection with a single magnet. 3. Will not an intensity battery work much better on a magnet wound with coarse wire than a quantity battery on a magnet with fine wire? A. Yes; but it would be best in all cases to adapt the battery and the magnet to each other. 4. Is there any other way to obtain the speed of small motors when a pencil tied to the shaft with a piece of paper drawn over it reduces the speed, even when making an almost imperceptible mark? A. You can do it by allowing the armature to act as an interrupter to a jet of air. The motor will then act as a siren. The tone produced may be compared with that of a musical instrument; and as the rate of vibration required to produce such a tone is known, you can readily decide as to the velocity of your motor. 5. What is India ink made of, and why has it such an abominable smell after standing mixed for some time? A. India ink is made of extremely fine lamp black and a gum. The smell to which you refer is due to the putrefaction of the gum.

(15) P. E. writes: 1. After dissolving one gramme of rock phosphate in half an ounce of HCl to keep the iron and alumina in solution, I add citric acid in crystals, but I get a precipitate, which I think ought not to be. What can be the cause? A. We think that the precipitate will be avoided if you use, for every two grammes of the rock, 2½ grammes oxalic acid and 4 grammes citric acid dissolved in 10 c. c. of acetic acid, instead of the crystallized citric acid. 2. Then I have to neutralize the solution with ammonia until a faint precipitate appears, and have to redissolve the precipitate with a small quantity of HCl, and have to add oxalic acid to precipitate all the lime present. What is the quantity of oxalic acid I must make the solution of to add to the precipitate; make alkaline with ammonia, and allow to stand for 12 hours? A. A concentrated solution, almost up to saturation, can be used. 3. To the filtrate, which I have to make strongly alkaline with ammonia, I must add a quantity of chloride of ammonia to prevent any magnesia being precipitated, and then I have to add magnesia mixture, to precipitate all the phosphoric acid. A solution containing how much chloride of ammonia must I use, and how many c. c. of the magnesia mixture? A. The quantity of ammonium chloride required depends upon the strength of your magnesia mixture. It is best to use a standard magnesia mixture solution, from which you can readily calculate the proper amount of the ammonium salt necessary. The quantity of phosphoric acid contained in your rock determines the amount of magnesia mixture required; 45 grammes of the crystallized sodium acetate. Teschemacher and Smith published in London, a few years ago, a little book on the proper methods to be used in analyzing phosphate rock, which would doubtless be valuable to you.

(16) J. E. W. asks: Will quicksilver, if thrown in a canal or pond, work its way through the bank or dam, and thereby cause a leakage and break? A. Quicksilver tends to penetrate porous substances only by its weight or gravity. It does not wet or attach itself to the surface of the particles of sand as water does, and hence has not capillary attraction to help draw it through a porous substance. This we think partially counteracts its superior gravity, and will make it no more liable to filter through a canal bank than the water itself; certainly not to the extent of displacing the material or facilitating the flow of water.

(17) T. J. B. writes (1) for a recipe for preparing a good glue to use with pine wood. A. Use an ordinary glue to which a little glycerine has been added. It is best to use the glue while hot. 2. A recipe for preparing a walnut and mahogany stain? A. To stain black walnut: Take 1 quart water, 1½ ounces washing soda, 2½ ounces Vandyke brown, ¼ ounce bichromate of potash. Boil for ten minutes, and apply either in a hot or cold state. For mahogany: Boil ½ pound madder and 2 ounces logwood chips in a gallon of water; brush well over the wood while hot; when dry, go over the whole with pearlash solution, 2 drachms to the quart. 3. What kind of varnish to use after such furniture is stained? A. A good mahogany varnish consists of sorted gum anime 8 pounds, clarified oil 3 gallons, litharge and pure dried sugar of lead each ¼ pound; boil till it strings well, then cool a little, thin with oil of turpentine, 5½ gallons, and strain.

(18) W. G. J. asks for any mechanical method whereby the air can be taken out of water. A. You can free the water from air by boiling, or by a vacuum pump. With your unlimited water power, you may set the freezing cans or boxes filled with water into a chamber capable of withstanding a vacuum pressure, and then pump the air from the chamber, when the air will also leave the water. A chamber made so that a half dozen water cans would just fill it could be so arranged as to complete the operation every half hour, and in this way, with 2 or 3 chambers, make many tons of water airless per day. If the freezing cans could be made strong enough, no chamber would be necessary, only caps with rubber rings with a pipe leading to the air pump.

(19) R. H. E. K. asks the best mode of cleaning the grooves of a Smith & Wesson No. 3 United States Army revolver, without risking blunting sharp edges. A. Make a little scraper out of stiff iron wire by screwing the wire in a vise and hammering the end over the edge of the vise jaw, then file to fit the pistol groove. Take the barrel out of the stock, and hold up to the light, when you can see to scrape out the grooves. If they are badly leaded, you may have to make a chisel shaped scraper, with which you can plow out the grooves.

(20) W. W. C.—A hot cannon ball cools from the outside. If cooled in water, the surface may be black while the center is red hot. A cannon ball or any ironwork will sink to the bottom of the ocean as fast as gravity will carry it through the water. No matter how great the pressure is at great depths from the superincumbent mass of water, the specific gravity of the water is but little greater than at the surface. Hence all substances as stone, sand, mud, clay, shells, etc., exist at great depths with but little variation, except from the effects of decreased light.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

November 3, 1885,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Auger bit, H. S. Lord ... 329,660
Axle, F. C. Hockensmith ... 329,453
Axle, divided car, Thielsen & Dilg ... 329,604
Axle lubricator, J. H. Coleman ... 329,816
Axle, vehicle, P. K. Hughes ... 329,835
Bag. See Paper bag.
Baggage elevator, I. S. Banta ... 329,695
Barrel sustaining apparatus, J. D. Westgate ... 329,524
Barrel washing machine, H. Nadorff ... 329,847
Bed, sofa, F. Fischbeck ... 329,548
Beds and berths, safety attachment for, J. C. McMurray ... 329,663
Belt tightener, F. J. Schupp ... 329,492
Bench stop, F. H. Whitney ... 329,795
Bending machine, E. Andrews ... 329,613
Berries, etc., device for assorting, J. B. Johnson ... 329,565
Binder, temporary, A. Dom ... 329,444
Bit. See Auger bit. Bridle bit.
Block. See Paving block.
Board. See Flooring board.
Boiler. See Steam boiler. Wash boiler.
Boiler furnace, C. B. Davison ... 329,539
Boiler safety device. W. A. Tracy ... 329,509
Boilers, feeding water to, A. De Dion *et al.* ... 329,722
Bolt. See Lock bolt.
Book covers, machine for removing superfluous gold leaf from, E. Straker ... 329,863
Book support, A. Clarke ... 329,719
Boot jack, H. Lightwardt, Jr ... 329,576
Boot or shoe, G. W. Day ... 329,630
Boot or shoemaker's use, combination tool for, T. E. Tateum ... 329,503
Bottle stopper, L. Kirchner ... 329,652
Bottle stopper, B. B. Lewis ... 329,574
Box. See Letter box. Paper box. Poultry scalding box. Sample box. Saving box. Telegraph call box.
Box fastener, E. Andrews ... 329,614
Brace. See Vehicle brace.
Brake. See Car brake. Line reel brake.
Brake shoe, J. J. Lappin ... 329,459
Bridle and bridle attachment, Tourgee & Jennings ... 329,508
Bridle bit, E. Q. Darr ... 329,629
Broom winding machine, L. Perron ... 329,852
Buckle, J. Simpson *et al.* ... 329,860
Burial casket, Sieber & Borntraeger ... 329,495
Burner. See Gas burner. Vapor burner.
Butter worker, H. F. King ... 329,746
Button fastener, J. Christy, Jr ... 329,437
Button fastener, C. F. Harlan ... 329,644
Button fastener, E. Ivins ... 329,744
Buttonholes, working, S. B. Ferris ... 329,635
Cable coupling, H. F. Gale ... 329,727
Cables, siphon recording instrument for, W. Dickenson ... 329,723
Calk and hoof pad, detachable heel, J. Dabus ... 329,627
Camera and box combined, adjustable, C. H. Scofield ... 329,599
Candle extinguisher, B. M. O'Boylan ... 329,765
Car brake, A. L. Kirkland ... 329,840
Car brake, J. F. Mallinckrodt ... 329,462, 329,464, 329,465
Car brake, street, J. F. Mallinckrodt ... 329,463
Car coupling, G. H. Colby ... 329,537
Car coupling, F. J. Schupp ... 329,493
Car coupling, J. Whitmore ... 329,794
Car for cable ways, S. H. Terry ... 329,786
Car mover, C. V. Greenamyer ... 329,642
Car signal, tram, T. L. Johnson ... 329,566
Car steps, folding, J. H. Cruger ... 329,440
Car starter and brake, S. Johnson ... 329,839
Car, stock, J. H. Chamberlin ... 329,716
Car, stock, Koenig & Lee ... 329,841
Car ventilator, E. S. Perry ... 329,591
Car wheels, manufacture of, C. B. Beach ... 329,617
Carbon for incandescents, obtaining, Nicholson & Bowen ... 329,670
Carburetor, L. F. McNett ... 329,664
Carriage, extension baby, A. McLean ... 329,579
Cart, dirt, J. N. Bodine ... 329,702
Cart, dirt, Bodine & Smith ... 329,703
Carving machine, F. Holland ... 329,647
Cash carrier elevator, J. C. Miller ... 329,475
Castrating instrument, J. F. Allen ... 329,691
Chain machines, link counting attachment for, E. L. Howe ... 329,837
Chair. See Exercising chair. Rocking chair.
Chair, W. Boscawen ... 329,805
Check rein hook, R. W. Owen ... 329,852
Check rower attaching iron, Eberhart & Stevens ... 329,725
Churn, G. F. Day ... 329,443
Churn, H. Mott ... 329,762
Churn dashers, device for operating, J. P. & J. M. Lucas ... 329,751
Churn, swinging, W. J. Temple ... 329,689
Clasp for suspenders and other articles, J. T. Budd ... 329,434
Cleaner. See Lamp chimney cleaner.
Clock, alarm, A. O. Jennings ... 329,455
Clothes drier, B. F. Buxton ... 329,620
Clothes pin, L. B. Prindle ... 329,487
Clutch, friction, W. B. Tatro ... 329,866
Cock or valve, J. Buffet ... 329,809
Cock, self-closing, J. E. Boyle ... 329,807
Coffee, apparatus for treating hot roasted, J. C. Salzgeber ... 329,490
Coffins, apparatus for lowering, Weidenmann & Gruninger ... 329,522
Collar, R. Butterworth ... 329,812
Collar and hame, horse, A. W. Tourgee ... 329,507
Coloring matter obtained from tetrazo-ditolyl, C. Duisberg ... 329,632, 329,633
Coloring matter, production of new yellow, E. Frank ... 329,639
Coloring matter, violet, F. Fischer ... 329,637
Coloring matter, yellow, E. Frank ... 329,638
Cots, automatic head support for, W. H. Wooldridge ... 329,610
Coupling. See Cable coupling. Car coupling. Thill coupling. Whiffletree thill and pole coupling.
Cover for chamber vessels, J. S. Davison ... 329,441
Crusher. See Ore crusher.
Crushing machine, A. Higley ... 329,553
Cuff, R. Butterworth ... 329,813
Cultivator, Avery & Berrien ... 329,802
Cultivator, D. W. Bovee ... 329,707
Cultivator, T. H. Crooks ... 329,819
Cultivator, W. S. Pates ... 329,590
Cultivator, listing, J. P. Black ... 329,530
Cutter head, E. C. Mershon ... 329,756
Cylinders, forming teeth upon, O. T. Bugg ... 329,811
Dental plugger, W. K. Moore ... 329,587
Deodorizing and disinfecting apparatus, W. A. Hawkins ... 329,645
Die, W. Allderdice ... 329,801
Dish washer, C. A. Haskins ... 329,452
Door fastening, C. P. Combs ... 329,624
Door securer, D. H. Parkhill, Jr ... 329,673
Dredging apparatus, G. F. Badger ... 329,428
Drier. See Clothes drier.
Drill. See Ratchet drill. Rock drill.
Drum, heating, M. Ryan ... 329,857
Drum, spring-actuated, J. R. H. Hinton ... 329,836
Dyestuff or coloring matter, red, E. Elsaesser ... 329,634
Dyestuffs, production of new violet, F. Fischer ... 329,636
Dyeing apparatus, L. Pfaff ... 329,483
Egg poacher, W. H. Silver ... 329,859
Electric circuit breaker, C. L. Bruns ... 329,808
Electric earth battery, G. F. Dieckmann ... 329,724
Electric light support, C. L. Travis ... 329,510
Electric machine regulator, dynamo, W. M. Schlesinger ... 329,681
Electric switch, H. Lemp ... 329,460
Electrical distribution, system of, H. M. Byllesby ... 329,621
Elevator. See Baggage elevator. Cash carrier elevator. Grain elevator. Water elevator.
Engine. See Rotary engine.
Engine, A. E. Johnsen ... 329,563
Exercising chair, J. M. W. Kitchen ... 329,570, 329,653
Eye bars and similar articles, manufacture of, C. L. Strobel ... 329,501
Eyelet or buttonhole, metal, T. B. Ashford ... 329,692
Fabrics, machine for trimming, Sweeney & Rehfuss ... 329,865
Fan, automatic, J. M. Seymour (r) ... 10,657
Fan blast regulator, A. Kahl ... 329,567
Feathers for dusters, machine for preparing, S. M. Park ... 329,672
Feed water heater, C. H. Robinson ... 329,488
Feeding rack, H. D. Streator ... 329,500
Fence, adjustable panel snow, R. H. Gleason ... 329,640
Filing case, H. W. Reade ... 329,676
Filter, H. H. Teeter ... 329,505
Firearm, breech-loading, M. Wheeler ... 329,793
Fire boxes, deflector plate for, A. J. Stevens ... 329,603
Fire escape, P. Huber ... 329,648
Fire extinguishing apparatus, J. Hill ... 329,741
Fireplace, M. King ... 329,747
Fires, automatic sprinkler for extinguishing, J. A. Miller, Jr ... 329,585
Flood gate, J. A. Galloway ... 329,726
Flooring and wainscoting, wooden, A. Green ... 329,828
Flooring board, J. R. Baldwin ... 329,616