

RECENTLY PATENTED INVENTIONS.

Engineering.

ROTARY ENGINE.—Albert D. Bellinger, Black River Falls, Wis. This engine has a cylinder with a ring lining having annular shoulders, a wheel turning in the cylinder comprising a rim carried by a spider, a lining held on the rim and packing plates extending from it and its lining to the shoulders on the lining of the cylinder, rings being secured to the outer edges of the rim to hold the packing rings in place. The invention also embraces various other novel features, designed to form a simple and durable engine which will utilize the motive agent to its fullest extent while reducing friction to a minimum and compensating for any endwise thrust or movement of the shaft, so as not to disturb the relative position of the piston and cylinder.

SPARK ARRESTER.—Harry B. Maxwell, Stombsburg, Neb. The exhaust chamber, according to this improvement, has a reducing nozzle, and an exhaust nozzle is held to deliver into the nozzle of the chamber, while a longitudinally adjustable petticoat pipe is held in the chamber nozzle, the arrangement, instead of interfering with the draught of the engine, being designed to increase the draught, while absolutely preventing any live sparks from being thrown from the stack, which is provided with a convenient carrier to receive and carry the sparks to any desired point.

FLUE CLEANER.—Perry A. Burgess, Steamboat Springs, Col. This device comprises a blade to which is hinged a handle and an adjusting rod, the other end of the latter being detachably secured to the handle, while the rod also works through a guide secured to the handle. The device may be inserted through a small aperture and adjusted after being entered to extend transversely to the pipe or flue, the guide serving to hold the adjusting rod in the correct position, and also stiffening the rod to act as an efficient brace.

Electrical.

RAILWAY SIGNALING CIRCUIT.—Louis Thaler, New York City. Combined with non-insulated track rails are connected insulated bars in parallel with and sustained on the rails slightly above their top faces, there being a battery and an electric indicator in open circuit with the bars, the circuit to be closed by the car wheels depressing the bars. The apparatus affords a simple mechanism for the automatic electric operation of a signal at a station when the block is occupied, the circuit being completed through the ground as part of the circuit at any point of a block entered or occupied by a car or train.

STREET ELECTRIC LAMPS.—Charles R. Eddy, Springfield, Mo. This invention provides a simple and inexpensive windlass for raising and lowering street electric lamps, for cleaning and supplying new carbons, etc. The device has a detachable crank member, having unlocking means by which the shaft-locking devices of the windlass may be operated to unlock them when the crank is applied, the shaft of the windlass being normally held locked. Only a single crank is necessary for operating a number of windlasses, which automatically lock themselves as soon as the crank is removed.

INSULATOR.—Augustus R. Lane, New York City. This device consists essentially of a somewhat C-shaped metal frame, with a screw projecting from its bottom portion, whereby the frame may be attached to a pole or other support, and a set screw passing through its upper portion, to bear upon and hold in position in the frame the insulator, consisting preferably of two sections of glass, having opposite grooves in which the conductor is held when the sections are placed together and held in position by the set screw. Several of these clamp frames may be formed upon a single skeleton frame if desired, needing only one screw extension for attachment to a support.

Mechanical.

ANTI-FRICTION BEARING.—Peter Beckman, Bucksport, Me. This is a novel form of bearing in which a vertical shaft is held to turn in a support having horizontal bearing portions, there being on the shaft a bearing disk rolling on balls traveling in annular grooves in the lower face of the disk and the upper face of the bearing portion. To prevent lateral thrust or movement and further decrease friction, similar balls are arranged in annular grooves in the bearing portions and around the shaft.

HAND POWER ATTACHMENT.—Finley M. Foster, New York City. This is a simple and inexpensive device whereby sewing machines, etc., may be run by lever power actuated by hand, or in conjunction with foot power applied in the usual way. Clamp plates to be firmly screwed on the machine support a shouldered bolt which forms a journal for a hand lever, whose outer end is connected with a pitman adapted for connection with the treadle, so that by operating the hand lever the machine may be run without pressing upon the pedal.

LUBRICATOR.—Charles Tregoning, New York City. This is a device especially adapted for use upon elevator machinery, whereby all the pulleys on a shaft may be simultaneously and constantly oiled, the amount of oil used being under ready control. The shaft on which the pulleys to be oiled are mounted has an exterior longitudinal channel in which is fitted a tubular valve, each pulley covering an aperture in the valve casing. At the open end of the valve casing is a head with which is connected an oil cup and an adjusting device, the latter being adapted to move a valve slide adapted to open or close the apertures in the valve casing, whereby the flow of oil is readily controlled.

Agricultural.

HARROW.—Niels L. Beck, Brayton, Iowa. According to this improvement, the construction of the body of the harrow is such that the body may conveniently be made as long or as wide as may be desired, and be readily put together in a short time. A principal feature of the invention is the construction of the harrow teeth and their location in blocks, each block being adapted to carry a tooth, and the manner in which the blocks are attached to the frame, the blocks serving not

only as carriers for the teeth, but as binding or connecting devices for the frame.

CORN PLANTER ATTACHMENT.—Andrew W. Trotter, Petersburg, Ind. This is a furrow-closing or covering attachment located at the rear of the seed drop tube, and consists of a standard secured to a fixed support on the planter, and carrying a covering wheel at the rear of the lower end of the seed drop tube, the wheel standing at angle to the path of this tube and diagonally across the furrow made by the plow. The device closes the furrow and distributes the soil evenly over the seeds dropped therein.

SEED PLANTER.—Alexander Learmouth and Arnold A. Beltman, Tower City, North Dakota. This is an improvement in planters which have furrowing wheels mounted in elastic or spring bearings. These wheels are made as light as may be desirable, and each wheel has an independent bearing, so arranged that the wheel is normally held down with considerable force by a spring-pressed plunger, but should the wheels encounter any obstacle, they are free to rise and pass over it, at once resuming again their normal position to continue the furrow or furrows.

SPRINKLING DEVICE.—Henry I. Schanck, Holmdel, and Charles B. Ellis, Freehold, N. J. The frame of this device is carried upon wheels, to be drawn by an animal, and supports a cask or other liquid-holding vessel, for the mixing and distribution of liquid preparations upon growing plants. The device forms an efficient poison distributor, the liquid being projected out upon the plants from a jet nozzle.

Miscellaneous.

VIOLIN SUPPORTER.—Giorgio Nardetti, 318 Second Avenue, New York City. This is a device to hold the violin in correct and artistic position on the body of the performer, enabling the latter to play and lead at the same time. The invention consists principally of an arm having a limited swinging motion on the end of the violin body, a breast plate pivotally connected at one end to the free end of the arm, and a locking device for locking the breastplate to the arm in either a vertical or horizontal and folded position. A curved collar or neck plate is also secured by a set screw in a socket on the free end of the arm, and the collar and breast plate both engage the body of the performer to hold the violin in proper place, facilitating the execution of any desired passage of music with great ease, so that full, rich sounds are produced.

PIANO.—William P. Haines, New York City. According to this improvement, brackets formed with guideways support the action, and a rail sliding in the guideways carries strips of damper fabric adapted to be moved into or out of the path of the hammers, so that the player can, without changing his position, instantly change the piano from loud to mute, or *vice versa*, as may be desired for practicing or other purposes.

GRAND STAND.—Pascal P. Cuplin, West Bend, Iowa. This is a stand which may be revolved, either having a revolvable base held to float in a reservoir or being mounted to be turned on a post by gear teeth on the flange of the base, the usual superstructure of such a stand being carried by the base. It is more especially adapted for use in connection with race tracks, as it may be placed inside the track, thus being nearer all portions of the course than is possible with a stand placed outside the track, while the revolving of the stand during the progress of the race keeps the competitors all the time in view.

CULVERT.—Charles B. Davis, Savona, N. Y. This invention consists of two series of curved metallic plates placed one on top of the other to break joints, and riveted together to form a double-walled arch, flanges being formed on the ends of the sets of plates and bent in opposite directions to form a foot for the arch. The construction forms a simple and durable culvert, readily set up in place and cheaply manufactured, stones or other material being placed on the top of the metallic arch to finish the culvert as desired.

FAN.—Theodore F. Davis, Marshalltown, Iowa. This invention provides an improvement in the class of fans used upon grain separators to blow the grain and chaff upon and over the riddles and sieves, the fan having an air opening the entire width of the fan blades and parallel with the axis of the fan, so that there is a perfectly equal and even current of air generated, enabling the grain to be perfectly cleaned. The opening has a cap or damper which may be nicely controlled to admit just the desired amount of air to the fan casing.

FIRE ESCAPE.—Perry A. Burgess, Steamboat Springs, Col. This device has a frame to be hung where convenient on the building, and a harness for adjustment on the user, the weight of a suspended body causing a sprocket wheel and ratchet wheel in the frame to be turned, actuating an escapement which takes the place of a brake and permits one to descend safely to the ground. The escape also forms a convenient means for lowering valuable packages. The device is so compactly constructed that it may be conveniently carried in a person's luggage.

DENTAL APPLIANCE.—Samuel P. Sharp, Knoxville, Tenn. This is an improvement in the class of angled tool holders for dental engines. The improved attachment may be applied to any existing form of dental engines, or it may have a handle of its own especially adapted to it.

MAKING EXTRACTS.—John E. McCarty, Elkins, West Va., deceased (Ella M. McCarty, administratrix). This invention covers a process and apparatus, according to which the material to be acted on is submerged in hot water in a closed vessel, under regulated pressure and temperature, while simultaneously and mechanically there is produced a vertical circulation of hot liquid through the mass. The invention is designed to effect economy in the extraction of tannin from barks and wood, reducing the time and obtaining a larger percentage of tannin.

BAG OR POUCH.—Frederick M. Turck, New York City. This invention provides a fastening device which may be used upon all kinds of receptacles for mailing purposes, or for the transportation of merchandise, when the receptacles are of paper, fabric, or other pliable material. The means of attaching the flap to the body of the bag are simple and durable, inexpensive, and capable of quick and ready manipulation.

APPARATUS FOR MANUFACTURING SALT.—John Runciman, Goderich, Can. da. This apparatus comprises an annular evaporating pan, within which and sloping upward and inward is arranged a drying table having an outlet at the center, in connection with mechanism to transfer salt from the pan to the drying table and work it upon the latter to the central outlet or discharge. The salt is made from brine, and the drying of the salt and making it ready for grading and packing are much expedited by this apparatus.

WATCH CHAIN CHARM, ETC.—Samuel A. Stahl and Benjamin Klipper, Knoxville, Tenn. This is a charm or piece of jewelry of globe form, representing the land and water of the earth, with holes through it at places of historical or national importance, in combination with a microscope inserted at such places and containing views illustrative of the events which give notoriety to the places.

BICYCLE GEAR.—William Mahoney, New York City. This is a speed-multiplying gear, for use in connection with safety bicycles, so that a person may drive the machine very rapidly without making his feet move very fast.

FIRE KINDLER.—Albert Johnson, Haverhill, Mass. A cheaply formed wire handle has at one end a loop to which is fastened a swab made of leaves of asbestos or other indestructible absorbent, and the swab is kept immersed in oil until required for use, when the absorbed oil adapts it for burning a long time. The device may also be advantageously used for thawing pipes, burning insects off trees, and for other purposes.

Any of the above books may be purchased through this office. Send for new book catalogue just published. MUNN & CO., 361 Broadway, New York.

NEW BOOKS AND PUBLICATIONS.

FINITE HOMOGENEOUS STRAIN, FLOW, AND RUPTURE OF ROCKS. By Geo. F. Becker. Bulletin of the Geological Society of America. Vol. iv. Pp. 18-90. Rochester, N. Y. 1893.

The author uses mathematics freely in support of his views. The subject is a difficult one, and the present pamphlet will be a welcome addition to the literature of physical geology.

SCIENTIFIC AMERICAN BUILDING EDITION.

FEBRUARY, 1893, NUMBER. (No. 88.)

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1. Elegant plate in colors, showing a very picturesque dwelling at St. David's, Pa. Floor plans and perspective elevations. An admirable design. Mr. N. Trumbauer, architect, Philadelphia, Pa.
2. Plate in colors showing a residence at Bridgeport, Conn. Two perspective views, one interior view and floor plans. Messrs. Longstaff & Hurd, architects, Bridgeport, Conn. An excellent design.
3. A model dwelling at Holyoke, Mass., erected at a cost of \$6,000 complete. Perspective views and floor plans. H. W. Coolidge, architect, Holyoke. A pleasing design.
4. A cottage erected at Cranford, N. J., at a cost of \$5,000. Floor plans, two perspective views, etc. F. W. Beall, architect, New York.
5. The First Baptist Church recently erected at Warberth Park, Pa., at a cost of \$6,000. A unique design in the Gothic style of architecture.
6. A residence recently erected at Bridgeport, Conn., at a cost of \$5,900 complete. A picturesque design. Perspective elevation and floor plans. Mr. C. S. Beardsley, architect, Bridgeport.
7. An elegant residence recently erected at Newton Highlands, Mass. Perspective view and floor plans. Cost complete \$6,472.
8. An attractive design for a suburban dwelling at Holyoke, Mass. Perspective elevation and floor plans. Messrs. Gardner, Pyne & Gardner, architects, Springfield, Mass.
9. A row of model dwelling houses on West Sixty-eighth Street, New York City. An exquisite design. Floor plans and perspective.
10. A cottage at St. David's, Pa., recently erected at a cost of \$5,100 complete. Floor plans and perspective elevation. Messrs. F. L. & W. L. Price, architects, Philadelphia.
11. Views of the extensive red sandstone quarries at Potsdam, N. Y., together with views of various public and private residences built of Potsdam red sandstone.
12. Perspective and floor plans for an architect's residence at Buffalo, N. Y.
13. Miscellaneous contents: Architecture in brick—Architecture and the phonetic arts—The housing of workers—Concrete roofs—Roman temples—An automatic perspective machine, illustrated—Drake's Columbus drinking fountain—Sleigh bells—A planing machine requiring little room, illustrated—An improved side and roofing tile, illustrated—An improved spring hinge, illustrated—An improved hand planer and jointer, illustrated—To darken oak—An improved automatic water gate, illustrated.

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Stow flexible shaft. Invented and manufactured by Stow Mfg. Co., Binghamton, N. Y. See adv., page 46.

Screw machines, milling machines, and drill presses. The Garvin Mach. Co., Laight and Canal Sts., New York.

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The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4; Munn & Co., publishers, 361 Broadway, N. Y.

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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 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 10 cents each. Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(4684) D. G. E. asks: How many pounds of coal will be required to heat one ton of sand from 40° Fah. to 212° Fah., the sand being contained in an iron cylinder 12 inches in diameter and surrounded by the fire, and bituminous coal being used. A. It will require 61 pounds of good coal, provided no heat is lost; practically 100 pounds of coal is near the quantity required.

(4685) F. W. T. writes: I have "Experimental Science," and there are a few things I would like to ask you with reference to the simple motor on page 499. 1. In Fig. 486, should the wire used in making the core of the armature be insulated or should it just be covered with adhesive tape when it is finished? A. It is of some advantage to varnish the iron wire used in making the armature core before it is wound on the spool, unless the wire is sufficiently oxidized to practically insulate it. 2. Should it be iron or copper wire? A. By referring to the description of the motor given in "Experimental Science" you will notice that copper wire will not do. The core should be made of soft iron wire. 3. About how near should the armature come to touching the wider part of the field magnet when the motor is in position? A. As near as possible without coming into actual contact with the field magnet. 4. Should the armature revolve on the steel shaft like a wagon wheel on the axle or should it be stationary in the armature and revolve in the journal boxes? A. The armature should be secured to the shaft so as to carry the shaft with it. 5. How are the commutator brushes made? A. The commutator brushes are simply bundles of very thin spring copper. 6. Wouldn't it be cheaper to buy them? A. No. 7. Is the current from the battery sent through the same binding posts as those to which the commutator brushes are attached? A. Yes.

(4686) G. E. H. asks: 1. What is the E. M. F. of a 2x3 zinc carbon cell? A. 1.75 to 2 volts.

Size has no connection with voltage. 2. What is the E. M. F. of an ordinary phonograph cell? A. Two kinds of primary battery are used. One is the bichromate cell, giving 1.75 to 2 volts. The other is the Lalande-Edison cell, giving 0.5 to 0.75 volt. 3. Will you name a treatment for tartar on the teeth? A. Let a dentist clean them once a year. Use best quality of tooth powder. It is an excellent practice to rub the teeth with a stick of wood the end of which has been chewed to a brush.

(4687) L. G. asks: What changes will be necessary in the 8 light dynamo described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 600, to change it to a motor of at least 1/4 horse power, to run on a 110 volt circuit? How are spherical armatures wound? Have you a SUPPLEMENT describing same? A. We think the dynamo to which you refer is too small for 1/4 horse power. In the construction of a machine to run on a 110 volt circuit, we advise you to consult SUPPLEMENT, No. 844, containing a description of the small Edison dynamo and motor. We believe spherical armatures are wound on the open circuit plan. Nearly all the books on electric winding describe this winding.

(4688) W. E. P. & A. F. K. ask: Do rivers which flow toward the equator, by reason of the centrifugal force, of a necessity flow up hill? Why the Nile runs north and the Mississippi runs south? A. All rivers run down hill by the force of gravity. The spheroidal form of the earth is due to gravity, modified by its centrifugal force, and of which the surface of the ocean is the fixed datum or level. All streams, whether running north or south, that are above the datum of the sea level run by virtue of these two forces to a lower level. The fact of streams running farther from the earth's center is no paradox, when the true relations of the forces that hold the earth's surface to its spheroidal form are considered. The conditions of gravity and centrifugal force apply equally to running water and to the general form of the solid surface of the earth.

(4689) L. B. says: I wish to put a stern paddle wheel in a flat bottom boat, 15 feet long, 3 1/2 wide, for shallow water. I have a 50 pound fly wheel, 30 inches diameter. How many paddles, what size, what diameter of wheel, and how many revolutions per minute would be best? What is limit of speed in such a boat, power same manner as in bicycle? A. Make your wheel 2 feet wide, 4 feet diameter, 12 buckets 6 inches wide, 50 revolutions per minute. Will give you a speed of about 5 miles per hour. Doubtful if you can get this speed in the way you propose to work the wheel.

(4690) F. T. R. asks: What would probably be the result if a channel were cut into the crater of Vesuvius below sea level and the water allowed to flow into it? A. Probably it would become an extinct volcano if the quantity of water were sufficient.

(4691) E. A.—For information on electroplating machines we refer you to the SCIENTIFIC AMERICAN SUPPLEMENT. Glass after being ground to a smooth surface is polished by means of rouge or putty powder. Coffee grows on bushes to a height of from 9 to 15 feet.

(4692) C. S. J.—Tabby is a shell concrete, made of equal parts of lime, broken shells and sand. The old tabby buildings along the Southern coast derive their strength from good work and age. Have no literature on this subject.

(4693) J. G. asks: Was the subject, "The Human Body as a Magnet," ever discussed in the SCIENTIFIC AMERICAN? A. We do not call to mind any scientific articles on the human body as a magnet. We do not think magnetism was ever discovered in the human body.

(4694) R. L.—You can use four cells of Crowfoot battery to each cell of storage battery for charging. Gravity batteries, which are not expensive, can be purchased from any of the dealers in this city.

(4695) P. & D. ask: Does the upper part of a wheel move faster than the lower in rotating? A. The upper part of a carriage wheel in traveling on the ground moves much faster than the lower part of the wheels. It has several times been explained in SCIENTIFIC AMERICAN.

(4696) S. A. C.—The best single book for the study of armature winding is Thompson's "Dynamo Electric Machinery," which we can furnish by mail for \$9.

(4697) M. J. K. writes: My brother is going to start a brass foundry. What I wish to know is, what height and width (or area) will the stack or chimney require to be for two or three fires for melting brass. We have the furnace for small crucibles which has a grate surface of 14x14 inches=196 inches or 1 1/2 square feet nearly. We want the other fires to be larger, say 2 feet square for large crucibles. If you can furnish or give paper on the same would be very thankful. A. You will seldom run more than two furnaces at once, which will indicate a good sized business. A chimney 16 inches square inside and 50 feet high should give ample draught for your furnaces. We have no paper on brass foundry plant, but have an excellent book, "Brass Founders' Manual," by Graham, \$1 mailed. Larkin's "Brass and Iron Founders' Guide," \$2.25 mailed.

(4698) W. C. M. writes: Kindly tell me of a preparation that I can use, not to be costly, that I can form or press in a plaster flask like accompanying sample. Also tell me if you know of any attempts to make locomotive boilers return tubular and what was the objection to them. About what is the difference in saving of fuel between a straight flue boiler and a triple return tube? Would not half the number of flues that are in a locomotive boiler be sufficient to carry off the smoke and gases? A. The sample appears to be blotting paper saturated with a composition of tallow, beeswax, and a little oil to soften the mixture. We know of nothing cheaper that has the properties you require. The area of the tubes of a locomotive is not large enough in the present construction to allow the gases of combustion to move slow enough to have their heat absorbed. There will be no gain by returning the tubes unless the shell is made larger.

(4699) C. C. P. asks: Can very hot air be pumped into a boiler with an air compressor so as to

do one-third of the work? Will it not all be condensed? If it can be done, is there any economy in using air with steam? Is it safe to use air mixed with steam? Is it practical? A. Air, hot or cold, can be pumped into a steam boiler for useful work. There is no danger nor is there any profit. It condenses according to the pressure and does not give out as much work as it costs to put it in the boiler.

(4700) H. A. G. asks how to temper twist drills uniformly, that is to temper the whole drill at once. A. Twist drills should be packed in sand in an iron box and heated slowly to a cherry red, then dipped vertically in water. Brighten the surface and heat the drills evenly till an orange brown color appears on the bright surface.

(4701) H. H. B. asks: 1. Is a coil of a magnet the same resistance as the wire before it is wound on the coil? A. The resistance of the wire after it has been coiled on the magnet is slightly greater than it is in the original coil, on account of the hardening of the wire by bending. The difference however is very small and is negligible. 2. Would it release a building from danger of being struck by lightning if it were well insulated from the earth? A. No. 3. What can you put in sorghum so that it won't melt down in warm weather? The taffy is for making popcorn balls. A. Boil it for a longer time. Do not put in anything additional.

(4702) D. B. says: The purpose for which the answer is required is for a system of water works, distance from inlet to outlet of pipe 6 and 10 miles respectively; height or fall from inlet to outlet 100 and 125 feet respectively; size of pipe 4 and 6 inches. Question: Number of gallons that would flow through the outlet of a 4 inch pipe with a fall of 100 feet? Also from a 6 inch pipe with a fall of 125 feet? A. The 4 inch pipe, 6 miles, 100 feet head, will deliver 63 gallons per minute. The 6 inch pipe, 10 miles, 125 feet head, will deliver 151 gallons per minute.

(4703) C. E. H.—Aluminum weighs 163 pounds per cubic foot, pure, casting. Much that is called pure weighs 165 to 170 pounds per cubic foot.

(4704) L. C. asks: 1. What is the proper oil to use in coloring hard pine floors? A. Use boiled linseed oil for floors. 2. Is there any coloring material which you can put in the oil which will make them darker? A. A little burnt umber in the oil for darker shade. 3. What is the best method to apply the oil? A. Apply by rubbing the oil stain on the floor with a coarse woolen cloth. As little excess of oil as possible, so that it will dry quickly. For a new pine floor nothing is better than shellac varnish.

(4705) Constant Reader.—For a general description of the process of zinc etching, see SUPPLEMENT, No. 656. For fuller information, see Schraubstadter's "Photo Engraving," price \$3. We can also supply Wood's "Modern Methods of Illustrating Books," by mail for \$1.50.

(4706) H. P. R. asks: Why are coil pipes used on some steam gauges and not on others? A. Every steam gauge should have an inverted siphon in the connecting pipe to prevent the steam reaching the interior of the gauge to its injury. This may be a small coil or the pipe may drop enough to prevent the water returning to the boiler and the steam from reaching the gauge.

TO INVENTORS.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

February 14, 1893.

AND EACH BEARING THAT DATE.

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

Accumulator, W. A. Macleod.....	491,726
Advertising device, A. G. Macdonell.....	491,900
Air engines, heater for compressed, R. C. Smith.....	491,869
Air motor for propelling wheeled vehicles, compressed, J. Kames.....	491,892
Alarm, See Gas alarm.....	
Album, case, W. A. Holman.....	491,942
Amalgamator, ore, F. O. Norton.....	491,886
Ammonium chloride, apparatus for volatilizing, L. Mond.....	491,741
Armature and means for supporting the same, E. Kolben.....	491,598
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