

ENGINEERING INVENTIONS.

A car coupling has been patented by Mr. John B. Butts, of Kansas City, Mo. This invention furnishes an improved construction for raising the pin and retaining it in elevated position, so that a car may be bumped or shunted without coupling with an opposing car, and provides a means for retaining the link in suspension outside the drawbar when the cars are in an uncoupled position, with other novel features.

A railroad signal has been patented by Mr. Robert D. Anderson, of Ethel, La. A small lantern house is located conveniently to the track, suitably provided with lenses, and with a weighted curtain to roll or unroll in place of a flag, and this apparatus is so connected by an operating cord with the railway office that an order cannot be taken there by telegraph for a train without taking down a manifold clip controlling and operating the signal.

A railway switch has been patented by Mr. James B. Suffern, of Hillburn, N. Y. It is intended to be operated by the locomotive, without applying any fixtures to the locomotive, and consists in the combination with a track lever of a locking and releasing device connected with the switch bar, to move the switch bar when engaged by the car wheels, to close the switch, or to release the track lever, so that a passing train will produce no effect upon the switch bar.

AGRICULTURAL INVENTIONS.

A corn or cane harvester has been patented by Mr. Theodore Merrell, of Dixon, Ill. The invention covers various novel parts and details of a gathering and cutting mechanism, with shields extending over the wheels to prevent the severed stalks coming in contact therewith, and is an improvement on a machine which has been the subject of two former patents issued to the same inventor.

An attachment for harrows has been patented by Mr. James D. Armstrong, of Effingham, Kansas. The harrow is made with runners and a system of levers, whereby the teeth may be raised and lowered at will, or entirely withdrawn from the ground to enable them to be transported from place to place without inverting them or employing a wagon for their conveyance.

MISCELLANEOUS INVENTIONS.

A snap hook has been patented by Mr. Sidney S. Stahl, of Connellsville, Pa. The hook is provided with a snap spring normally resting against its inner surface, and has a spring-actuated latch adapted to lock the spring in such position.

A swing saw has been patented by Mr. James Martin, of Brooklyn, N. Y. This invention covers a construction whereby the saw is made to cut in a straight line parallel with the table or cutting surface, for changing its direction of cut to a variable angular relation, and so as to cut at different depths.

An ash sifter has been patented by Mr. William Coughlin, of New York City. A cylindrical sifter is mounted on a shaft to be rotated by a crank, and is provided with sifting bars, a spirally arranged plate, and agitators, with other novel features, to effectively separate the ashes from cinders and other bodies.

A collapsible carton has been patented by Mr. William Wright, Jr., of New York City. It is made with removable and collapsible end pieces, and a knock-down frame placed upon the inside, being more particularly designed to imitate boxes in which medicines, small bottled groceries, and other goods are packed.

An excavator has been patented by Mr. Howard W. Roop, of McMeekin, Fla. It has a shore pulley with driving mechanism, a bog anchor and its pulley, an endless cable and excavator bowls, with other novel features, the invention being an improvement on a former patented invention of the same inventor.

A duplex time ticket has been patented by Mr. William W. Currie, of Smith's Falls, Ontario, Canada. It is for keeping a record of the services of employes, the tickets being in exact register, and the various entries punched in both simultaneously, so that the duplicate must agree with the original when presented for settlement.

A music leaf turner has been patented by Mr. Albert J. Cole, of Waterloo, Iowa. The invention covers novel features of construction and the combination of parts in a mechanically operated device for automatically turning leaves of music for the convenience of the performer, and adapted also for turning the leaves of books.

A variable ticket has been patented by Mr. William E. Waller, of Rutherford, N. J. It is composed of individual characters, as letters, figures, etc., having pins, hooks, or equivalent devices for fastening them to goods, and connected by separable joints, the joint sections on each character interlocking with those on the adjacent character.

A mechanical movement has been patented by Mr. Dennis H. Bennett, of Allendale, Mich. This invention covers a novel construction and arrangement of parts for converting motion derived from a prime motor, to produce a rapid and powerful oscillating motion, which may be utilized for various industrial purposes.

A trunk strap has been patented by Mr. George A. Berry, of Colorado Springs, Col. It is provided with a separate loop, independent of the buckle, to take the initial strain, so that the buckle is left entirely free during the act of drawing up the strap, and the buckling may be effected with ease, no matter how tight the strap may be drawn.

A lifter and carrier has been patented by Mr. Franklin P. Keller, of Sabula, Iowa. It consists of bars with handles at their ends and plates hav-

ing teeth, supports working on the bars, and chains or other means of suspending the article to be carried from the bars, to facilitate the lifting and carrying of barrels, stoves, and other heavy articles.

A necktie fastener has been patented by Mr. August Larson, of Chicago, Ill. It has a main plate having a button hole, and a locking plate movably connected with the main plate, with one of its side edges arranged in a line intersecting the button, with a notch movable into and out of register with the button hole, whereby the necktie may be easily applied and then locked in place.

A steering gear for ships has been patented by Mr. Oliver Adams, of Larchmont, N. Y. Combined with the rudder post is a beveled gear attached thereto, a shaft supported above the gear carrying pinions meshing with the gear, to be interchangeably keyed to the shaft, which has a hand wheel, whereby the rudder may be made to turn in the same direction with the wheel or in an opposite direction.

A stencil printing machine has been patented by Mr. Charles N. Jones, of Ann Arbor, Mich. The invention covers a novel construction whereby the printing frame is so mounted that it is controlled by springs and treadle, leaving the operator's hands free for use in the actual printing and handling of the sheets, and a diaphragm is interposed between the stencil and the ink or pressure roller, to protect the stencil.

A fence has been patented by Messrs. Henry T. Lee and Charles Protsman, of Tullahoma, Tenn. This invention relates to fences made in panels formed of rails held together by looped wire hangers and supported upon inclined stakes, the parts being interchangeable, and the fence being such as can be erected or removed by a single person, one piece at a time, until finished.

An automatic alarm for drip pans has been patented by Mr. William Williams, of Brooklyn, N. Y. In connection with a float within a chamber of the vessel whose overflow is to be indicated, simple but novel means are provided whereby a series of alarms will be rung after the water or fluid has reached a predetermined height, thus obviating the danger of overflow.

An insecticide has been patented by Mr. William A. French, of Senatobia, Miss. It is to be used on live stock, for exterminating gnats, flies, and similar insects, and cure the poison from their bites, and is made of lard, coal oil, corrosive sublimate, alcohol, cobalt, benzine, sulphur, and other ingredients, in certain proportions and compounded in a specified manner.

A ventilating heater has been patented by Mr. Asa Weeks, of Minneapolis, Minn. It consists of an auxiliary stove mounted on a lower stove and surrounded by a jacket, the design also embracing a combined open and closed stove, the open stove having a casing or jacket at its rear, and the closed stove mounted on the open stove having a casing or jacket inclosing it and the pipe of the open stove.

A submarine torpedo has been patented by Messrs. Timothy Sullivan and Ernest L. Etheridge, of New York City. Its casing is composed of two main cylindrical sections connected to a central section, the rear section holding a rocket composition which propels the torpedo, the central section having radial rudders for steering it, and the front section being charged with gun cotton or other violent explosive.

A safety transparent box has been patented by Mr. George W. Smith, of Union City, Ind. It is cut from a single sheet, and has an outer and inner section, a closed end and inner and outer flap, the sides or bottoms having openings for the disclosure of the contents, being designed for the transmission of money or other articles, so that the contents may be seen to discover loss.

A bustle has been patented by Messrs. Edward D. and John Fraser, of Brooklyn, N. Y. It is formed from a single length of wire bent to the form of a volute spiral, the several coils being brought together and secured and the whole attached to a waist band, the bustle being quite pliable, and collapsing when subjected to direct pressure from the back without bulging at the sides.

An opera glass has been patented by Mr. Frederick Scheidig, of New York City. It is pivoted in a casing having a handle, with means for moving it into a position at right angles with the casing, and means for adjusting the focus while in the latter position, whereby it may be held very conveniently to the eyes, can be focused easily, is ornamental in appearance, and handy to carry.

A crate for shipping and packing hats has been patented by Mr. Sven P. Svensson, of Orange, N. J. It consists of parallel frames pivoted to each other, having attached transverse cords or lines adapted to engage and clamp the hat brim, and so spaced as to hold one hat independent of the other, so that the crate may be thrown upon either side or end without disarranging or injuring the hats.

A combined hot air and steam heating apparatus has been patented by Mr. John H. Waterman, of Cheboygan, Mich. Combined with a boiler and its inclosing heater and ash pit are an air supply chamber and pipe for conveying air to or above the fire, a damper to control the draught, and an automatic steam regulator adapted to simultaneously control both valves, the construction being well adapted for burning natural gas.

An instrument for describing circles has been patented by Messrs. Theophilus A. and Samuel B. Wylie, of Bloomington, Ind. The arm of the instrument is pivoted to turn upon an annular base as a center, and is adapted to hold a crayon or other marker in contact with the surface on which the instrument may be used, the device being more especially designed for school use in drawing circles and geometrical figures on a blackboard.

The desulphurizing and purifying of petroleum oils forms the subject of a patent issued to Mr. Daniel M. Kennedy, of Petrolia, Ontario, Canada.

The process consists in first preparing a solution of sulphate of copper, caustic soda, and chloride of sodium in water, then mixing the solution with the oil and heating the whole in a still and subsequently separating from the oil the combined metallic matter of the solution and sulphur in the oil.

A fence post has been patented by Mr. Louis Gratton, of Friendship, N. Y. It has a fixed bed, with short and long braces attached to the post at their upper ends and interlocking upon the bed, the longer braces having integral horizontal arms resting on the bed and terminating in vertical legs adapted to be driven into the ground at the end of the bed, so that no post holes need be dug and the posts are supported at a distance from the ground.

A dust collector has been patented by Messrs. William and James Comerford, of Rathdrum, Wicklow County, Ireland. It is a machine with an air filter of layers of granular material between perforated walls, with provision for constant renewing of the filtering medium, through which leads an air chute conducting the dust-laden air from grinding or other machinery, exhaust fans being used when desired for increasing the draught.

A combined ticket case and diagram has been patented by Mr. David D. Grant, of Franklin, Pa. The diagram represents the arrangement of the seats in a theater or other place, and has on its face pockets over or on the seat marked portions to receive and expose correspondingly numbered tickets, whereby the purchaser can see the tickets left for sale and the relative positions of the seats, the device being made flat, with or without a cover, or so as to fold conveniently for transportation.

A drawing board has been patented by Mr. Casimir M. Podgorski, of Northampton, Mass. Combined with the drawing board are strips attached to the upper surface, within its edges, and made to be adjusted upon a pivot at one end, the strips being formed with slots, in combination with slots in the supporting frame, whereby the T-square can be adjusted at any time to any line, no matter if the board and square are out of true, or the paper stretched or shrunken.

SCIENTIFIC AMERICAN BUILDING EDITION.

OCTOBER NUMBER.

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Special.

WHAT DID IT ?

It often happens that, when we have been doctoring for a new ailment, to our surprise some old complaint suddenly disappears, and we are at a loss to account for it. We cannot say whether it was the medicine we had taken or whether it was the change produced in us by the effort nature made to cast off our disease, and by the aid of some medicine reaching the nerve centers and thus revitalizing the system. The following are two very remarkable cases, that seem almost too wonderful to be true:

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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 Writer 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.

(1) O. S. B. asks how magnesium ribbon is made. A. The metal is first obtained either by chemical means or by electrolysis from one of the compounds of magnesium. The usual commercial process is that of Caron and Deville. A mixture of 600 grammes of chloride of magnesium, 480 grammes of finely powdered fluor spar, and 230 grammes of sodium in small pieces is thrown into a red hot crucible, which is then closed with the cover. After a short time a violent reaction takes place, and as soon as this is complete, the contents of the crucible are stirred around with an iron rod, in order to unite the small globules of metal into larger masses. The metal thus obtained contains several impurities, which may be eliminated by distillation. For this purpose the crude magnesium is placed in an iron crucible having an iron tube passing through from the bottom to within an inch of the lid. The crucible is filled with the crude metal to the level of the mouth of the tube, the lid carefully screwed and luted down, and the air displaced by a current of hydrogen or coal gas. As the crucible becomes heated, the magnesium distills over, passing through the upright tube into a box placed below, where on the completion of the operation it is found in the form of a coherent mass, which is subsequently melted and cast into ingots or any other form that may be required. By special machinery invented by a Mr. Mather, the metal is pressed when in a semi-fluid state into wire of varying thicknesses and of any required length, and this afterward flattened by pressure into ribbon. The recent decline in the price of magnesium is due to recent improvements in the process. The chemical brightness of the sun at a zenith angle of 67° 22' is only 36 1/2 times as great as that of magnesium, hence the value of this light as a source of chemically active rays for photographic purposes becomes at once apparent. 2. How is a good screen for a magic lantern made? A. To make an opaque white screen, coat heavy canvas twice with a calcimine solution containing a little glycerine or molasses, which prevent cracking. Lantern slides are colored with dilute aniline solutions. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 423, for full particulars.

(2) E. G. R. asks how to make a bellows for a photographic camera. A. There are two ways. One of the simplest is described on page 837 of the December 31, 1886, issue of the Photographic News. A sheet of heavy rubber cloth, large enough when folded over a box to form a complete bellows, is marked off in uniform spaces and then carefully folded up and pressed. By a series of cross folds the corners are made so that the whole will readily elongate. Full directions with illustrations may shortly appear. The inside of the bellows should be blackened with French polish, having ground with it a small quantity of lampblack powder. Very little should be mixed at a time, as it evaporates quickly. For the outside use shellac varnish blackened with lamp black, adding a very small amount of glycerine.

(3) W. R. asks how to blacken inside of a common bellows. A. See formula given to E. G. R., above.

(4) White Arrow asks (1) how to make gold paint, for gilding frames, etc. A. The process is a secret one. 2. How to cure shiny and greasy-looking face. A. Frequently washing with water, or with a solution of Rochelle salts in water, or, if the trouble is caused by bad digestion, consult a physician. 3. How to remove corns on feet without pain or great inconvenience. A. Use the following: Salicylic acid 30 parts, extract of cannabis indica 5 parts, collodion 240 parts. Mix, and apply with a camel's hair brush. 4. How to cure or prevent bone felon? A. As soon as it is felt, put directly over the spot a blister of Spanish fly, about the size of the thumb nail, and let it remain for six hours, at the expiration of which time, directly under the surface of the blister, may be seen the felon, which can be taken out with the point of a needle or lancet. 5. How to make an ink that writes black, remains black, and is really a jet black ink? A. See recipes given in SCIENTIFIC AMERICAN SUPPLEMENT, No. 157. 6. How to make a liquid polish for shoes that requires no rubbing to produce a shine. A. The well-known English liquid blacking of Day & Martin is said to be made as follows: Mix very finely ground animal charcoal, or boneblack, with enough sperm oil to thoroughly impregnate the mass, then add raw sugar or molasses, mixed with a little vinegar, and thoroughly incorporate. A small measure of dilute sulphuric acid is now introduced. Too much will be injurious to the leather, and too little will not make so good a polish, but exact directions cannot be given. When all effervescence has stopped, but while the compound is still warm, add vinegar until the mass is as thin as desired for bottling. 7. How to make luminous ink that may be read at night. A. See "How to Make Luminous

Paint," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 249. 8. Is there any certain and quick cure for headache and toothache? A. See "Headaches and their Treatment," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 258. 9. How to make a tooth powder that will cleanse the teeth thoroughly, leaving them spot- lessly white? A. Take of dry hypochlorite of lime 1/2 drachm and 2 drachms precipitated chalk, triturate together and mix thoroughly. This will, however, eventually injure the enamel of the teeth.

(5) D. T. asks if any of our readers have any knowledge of a microphone having the contact points made of platinum, which will reproduce articu- late speech.

(6) F. N. P. asks for a cement to make tight a wood photographic developing tray having a glass bottom. A. Coat the wood sides with asphaltum varnish and cement the joints with a cement made as follows: Melt together 1 part of pitch, 1 part resin, and 1 part plaster of Paris (perfectly dry).

(7) E. A. L. asks what the process is and apparatus necessary to manufacture flake litharge. A. In a general way, metallic lead is heated on the hearth of a reverberatory furnace. The oxygen of the air oxidizes the surface of the lead to litharge, which is scraped off.

(8) W. B. B. asks the proper mode of covering machinery pulleys with leather to prevent slipping of belt. I have tried lacing, but with poor suc- cess. Is there any cement I can use between the pul- ley and leather? A. Clean the pulley of all grease or oil, then scratch the surface all over with a rough file. Make a long scarf on one end only of the leather band, and the band a little wider than the pulley at the scarf, which will better facilitate drawing it tight. Use the best isinglass glue, and draw and clamp the thick end over the scarf. When dry, trim the thick end to an even curve.

(9) D. F. N.—1. The only tree-like plants that produce their fruit without the interme- dium of blossoms are tree ferns. 2. To promote the growth of the hair, have the following preparation made, and apply it twice a day to the scalp by means of soft sponge:

- Tr. nuxvomica.....2 drachms.
Carbolic acid.....1/2 "
Tr. cinchona.....1 ounce.
Tr. cantharides.....1/2 drachm.
Cocoanut oil and cologne water, suffi- cient to make a 4 ounce mixture.

(10) A. S. S. asks: What will remove the stain of iodine from the hair of a horse without in- jury to the horse or hair? A. Ordinary aqua ammonia will remove the stain instantaneously.

(11) J. N. P. asks the greatest perpen- dicular depth ever reached in the earth by well or mine. A. The deepest well is at Schliedenbach, Prussia. It is 4,300 feet deep. The deepest mine in Great Britain is the Rose Hill colliery, 2,445 feet deep, and a mine at Andreasberg in the Hartz Mountains is 4,500 feet deep.

(12) D. D. M. asks: Can electro-plat- ing plating dynamos be used to run electric lights, arc or incandescent? How many to a small plating ma- chine? A. An electro-plating dynamo gives electricity of too low tension for electric lights, except the very smallest incandescent or specially constructed ones of low resistance.

(13) F. P. asks: What substance will bleach wax, such as used for producing artificial flowers, etc., and also how to use same in order to obtain satisfactory results. A. Melt the wax in a jar, and put into it powdered nitrate of soda, in the propor- tion of 1 ounce to the pound of the wax. Afterward add by degrees 2 ounces to the pound of sulphuric acid, diluting with ten times its weight of water, keeping the wax warm and stirring the while. Let it stand a short time, and then fill up the jar with hot water, and allow the whole to cool. The wax should then be white. Afterward wash with water to remove any nitric acid that may remain, as it would make the wax yellow.

(14) D. F. F. asks concerning the quan- tity of fulminate mercury used in paper torpedoes and also of the preparation of fulminate mercury. A. The quantity varies considerably. Its preparation is as fol- lows: One part of mercury is dissolved in twelve parts of nitric acid; the solution mixed with an equal quan- tity of alcohol; and gentle heat is applied, the reaction, if too violent, being moderated by adding more spirit from time to time. The mercuric fulminate separates from the hot liquid, and after cooling may be purified from an admixture of reduced metal by solution in boiling water and recrystallization.

(15) S. G. C.—The fungus which you send to be named is a species of puff ball popularly called "earth star," from the stellate divisions of the external coat (peridium); whence also the scientific name geaster, a Greek word having the same meaning. There are quite a number of species, but none of them is very common. Some of them are extremely sensitive to moisture, and are driven about as shapeless masses by the wind till the first shower expands them. Others, on the contrary, expand when dry and contract when moist.

(16) W. C. I.—The plant is a native of Southern Florida, and would not endure the cold of a northern winter. The root should be lifted before the ground freezes.

(17) C. J. C. asks whether there is such a chemical compound as "hydric tartrate." A. "Hy- dric tartrate" is one of the terms used to designate tar- taric acid, which, strictly speaking, is hydrogen tar- trate.

(18) F. B. J. asks if there is an acid that will eat off printer's ink from a card without eating the card. A. No.

(19) D. H. B. desires a recipe for a su- perior liquid glue. Something that could be manu- factured largely under a copyrighted name, and stand the tests of these other goods now on the market. A. Take of best white glue 16 ounces, white lead, dry, 4

ounces, rain water 2 pints, alcohol 4 ounces, with con- stant stirring, dissolve the glue and lead in the water by means of a water bath. Add the alcohol and continue the heat for a few minutes. Lastly pour into bottles while hot.

(20) G. W. R. writes: Is there a black copying ink that can be used upon the glycerine copying pads? A. Use a strong aqueous solution of soluble ni- grosine (aniline black), in the proportion of about 1 to 5 or 7 of water, to which a little glycerine may be added. It is not as satisfactory as the violet ink, how- ever.

(21) M. E. writes: I have a handsome piece of statuary, composed of zinc which had been finished in imitation of bronze, that has become soiled. How can I finish it? I do not want a gold finish, but the dark bronze. A. There are various colored lacquers used for this purpose. Of these, a dark gray bronzing is made by mixing 1 drachm protochloride of tin and 1 drachm sulphocyanide of potassium with 1 pint of water.

(22) F. W. S. asks in which there is the greater percent of heat, in hard coal screenings or soft coal screenings. A. There is but very little perceptible difference in the heat. The variation in the amount of ash makes the principal gross difference, and this is as variable in the bituminous as in the anthracite. Some claim an excess of heat in bituminous, from its larger percentage of hydrogen.

(23) S. G. B. asks how to solder cast iron and tin ware together. A. It is a very difficult mat- ter to tin cast iron. The surface to be tinned may be made perfectly clean with a file; then use pure tin with a tinner's copper or soldering iron. Rub the surface with sal ammoniac. At the same time apply the hot tin- ning iron and the tin. Tinner's acid (muriate of zinc) applied freely will facilitate the flow of the tin, if it does not readily take at the first effort.

(24) H. N. B. asks the full name of the Emperor of Germany (the man that is 90 years old). Also his father's and mother's full name. A. Frederick William Louis Hohenzollern; he is the son of Freder- ick William III. and Louise Amelie Wilhelmine Auguste, of Mecklenburg-Strelitz.

(25) W. H. A. writes: I have a piece of buhl furniture, and the brass fretwork is coming out. Can you give me the recipe of some glue or cement to fasten it on with? A. Use a cement made by mixing together 4 parts of good glue and 1 part Venice turpen- tine.

(26) C. F. D. asks: What will be the result of placing shellac varnish over preservative or other varnishes? Will it be likely to crack in a short time? A. Shellac is about the hardest of gums. Put on over other varnishes that are perfectly dry, and with good surface it should make a fine hard finish.

(27) A. J. S. desires a receipt for a strong cement that will mend bisque. A. Burn some oyster shells, reduce to powder in a miller, and pass through a fine sieve; make this into a paste with white of egg. The shells should be thoroughly cleaned, well burned, air slaked, and finely powdered, making simply a fine article of lime. The parts joined must be held firmly together for two minutes or so after the cement has been applied. Be sure the parts are thoroughly clean before joining.

(28) J. E. P. desires information in re- gard to washing blankets and woollens without making them shrink. A. Scrape 1 pound soda soap, and boil it down in sufficient water, so that when cooling you can beat it with the hand to make a sort of jelly. Add three tablespoonfuls spirit of turpentine and one of spirit of hartshorn, and with this wash the article well and rinse in cold water until all the soap is taken off. Then apply salt and water and fold between two sheets, taking care not to allow two folds of the article washed to tie together. Smooth with a cool iron. Only use the salt where there are delicate colors that may run. If you can get potash soap, it will be better, as woolen manufacturers do not use soda soap.

NEW BOOKS AND PUBLICATIONS.

NYSTROM'S POCKET BOOK OF MECHANICS AND ENGINEERING. Pp. 670. Phila- delphia: J. B. Lippincott & Co. Price, \$3.50.

The nineteenth edition of this very comprehensive and most useful manual has been revised and corrected by Professor W. Dennis Marks, of the University of Pennsylvania. The present editor has added an article on dynamic electricity and one on the expansion of steam, but has confined himself principally to correc- tions of English and the formulæ of previous editions.

THE RELATIVE PROPORTIONS OF THE STEAM ENGINE. By William Dennis Marks, Ph.B., C.E. With numerous diagrams. Philadelphia: J. B. Lip- pincott Co. 1887. Pp. xxi, 283. Price, \$3.00.

This is the third edition of this useful manual. It is a collection of, or compiled from, a series of lectures. In it every imaginable factor of the steam engine is studied and formula deduced. Indicator diagrams, crank angles, link and valve motion are all fully treated of. In order to enable the engineer to enter his own notes and observations, blank leaves are bound in between the printed leaves. Some personal and practical notes give more animation to the book than the subject would seem capable of affording.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted October 4, 1887, AND EACH BEARING THAT DATE. [See note at end of list about copies of these patents.]

Table listing inventions and their patent numbers. Includes items like 'Adding machine, W. F. Gatewood', 'Alarm. See Fire alarm', 'Album stand, F. Seipelt', etc.