

RECENTLY PATENTED INVENTIONS.

Engineering.

AUTOMATIC SMOKE CONSUMER.—Gotthold Langer, Trenton, Mo. This invention provides a construction for admitting air through pipes and tubes above the fire to the fire boxes and furnaces of steam boilers, and shutting off the air automatically without the attention of the fireman or engineer, so as not to cool unnecessarily the interior of the furnace.

AIR BRAKE.—William H. Walker, Martinez, Ga. This invention covers an improvement in the class of brakes in which a reduction of pressure in the brake pipe results in the application of the brake, and provides a simple means for automatically effecting the desired reduction in certain instances, as if the track should spread, the truck mount the rail, etc.

ROTARY SNOW PLOW.—Edward Leslie, Orangeville, Canada. In this plow, which is an improvement on former patented inventions of the same inventor, the wheel has pockets with rigid walls and is open in front to admit the snow and open at the top for its exit, the plow being specially designed to quickly remove the snow from railroad tracks and throw it to a distance on either side.

Railway Appliances.

CAR COUPLING.—Francois P. Onzon, San Antonio, Texas. On the under side of the drawhead is mounted to turn a shaft on which are hooks, with their free ends adapted to swing in front of the drawhead to hold the link in position, with means for operating the shaft from either side of the car, the device being simple and durable, permitting the coupling of cars of different heights, and obviating the necessity of going between cars to couple and uncouple them.

METAL TIE.—Martin Hubbell, Mount Kisco, N. Y. This is a tie designed to indicate variations from the vertical alignment of the track, and afford means for connecting such deviations without removing the tie or loosening its parts, with means also for quick lateral adjustment of the rails, while affording an interlocking bearing surface to the lower face of the cross tie, whereby longitudinal and lateral displacement will be prevented.

CAR REPLACER.—James McGary, East Tawas, Mich. Detachable clips adapted to engage with the track rails, with locking cams or eccentrics, are used in connection with inclined replacing rails or bars, so that when applied the latter will form leaders to or above the main rails, and diverging downward and backward therefrom, to the proper position to accommodate the opposite side wheels of the derailed car or engine.

EXTENSION CAR STEP.—William W. Beebe, Malvern, Ark. This step is pivotally connected by links with the insides of the side rails of the fixed or main steps, notches being formed in the side rails of the extension step to engage the foot boards of the main or fixed step, making a device which can be readily brought into use, and can be folded upon the fixed step to protect the latter.

BRAKE BEAM.—Jacob W. Baker, Dover, N. J. This invention provides a novel construction for trussed brake beams, and means connected therewith for holding and securing the spring which relieves or holds back the brake shoe, the beam having an arched back bar doubled over upon itself at its ends and a front bar having its ends doubled over the folded ends of the arched bar, with fastenings clamping the doubled ends of both bars together.

Mechanical.

WRENCH.—Herwan Scheatzka, Bothell, Washington. One end of this wrench is designed to turn square or oblong objects, and the other for pipes or circular rods, the invention being designed to improve the facility of adjusting the jaws to the size of the object to be turned and provide for increasing the grip in proportion to the amount of power required.

SAW MILL SET WORKS.—Evan T. Davies, Portland, Oregon. This invention provides devices designed to permit of quickly and accurately setting the head blocks on the saw mill carriage in order to saw the log into lumber of any desired thickness, while being simple and durable in construction and very effective and automatic in operation.

LATHING.—Albert Weigle, Horn-an-Bodensee, Switzerland. This is a lathing easily applied to walls and ceilings, and consists of a series of reeds of small diameter placed alongside each other and supported on a wire and a second series of larger reeds parallel with the other reeds and interlaced with the same by a wire, and also supported on wires fastened to the wood backing.

PULLEY BLOCK.—Calvin H. Weeks, Haverhill, Mass. This invention relates to pulley blocks in which anti-friction balls are employed, and provides a composite sheave wherein a series of balls are loosely retained in a manner designed to greatly reduce friction, while simplicity of construction and durability of the parts are also secured.

Agricultural.

HAY STACKER.—Laban and Thomas Soseman, Oskaloosa, Iowa. This is an improvement on a former patented invention of the same inventor, designed to simplify the construction and provide a convenient means for raising the mast or pole of the stacker from the completed stack, and prevent its falling back when elevated gradually in making the stack.

TOBACCO STICK.—Joseph O. Renner and Noah Bowers, Greeneville, Tenn. In this stick to facilitate drying and curing tobacco leaves, longitudinal sections are secured together, and the headed hooks or pins are passed outward through each section alternately, each section serving to secure the hooks or pins of the other section from displacement.

Miscellaneous.

APPARATUS FOR PURIFYING AIR.—Benjamin S. Benson, Baltimore, Md. A filtering case is arranged near the window of a room, in connection with a heating case and heating chamber connected with a combustion pipe, and other novel features, for purifying the atmosphere for respiration, the construction being more especially adapted for use in sick or sleeping rooms, and the invention presenting improvements on a former patented invention of the same inventor.

BLOW PIPE REGULATOR.—Eugene W. Presbrey, New York City. This is a compound device particularly designed for use in the illumination of stages in theaters, etc., and is adapted to maintain a uniform and continuous flow of the gases, thereby producing a constant temperature and even intensity of light, while preventing any mixture of the two gases, and providing means whereby the regulator tanks may be filled or emptied separately or together.

MINER'S LAMP.—John Ratz, Hazleton, Pa. This is a small and convenient lamp with a hook on one side by which it is attached to the head covering of miners, the construction being such as to prevent the lamp from leaking at its filler orifice, and obviate liability of entanglement and matting together of the cotton wicking, and also to prevent the lamp from rocking laterally.

PIPE COVERING.—John F. Tracey, New York City. These coverings are preferably made of asbestos in half sections, each having integral end parts adapted to fit a pipe, with an intermediate recessed or hollow body portion assuring an air space next the pipe, the end parts of the coverings having grooves or passages making the air space continuous along a line of pipes.

PHOTOGRAPHIC CAMERA.—George Shorkley, New York City. In this camera the swing back is held adjustably in the camera casing to move the dry plate or film in proper position with regard to the object to be photographed, the swing back being pivotally connected with the camera casing, and the invention being an improvement on a former patented invention of the same inventor.

GATE LATCH.—John A. Lindberg, Dayton, Iowa. Combined with a hook capable of lateral movement upon a gate standard is a keeper having outwardly extending spaced arms with slots therein, and a lock lever fulcrumed in the slots of the keeper, the device being more especially adapted for attachment to light gates.

SCIENTIFIC AMERICAN BUILDING EDITION.

NOVEMBER NUMBER.—(No. 61.)

TABLE OF CONTENTS.

- 1. Plate in colors of a modern dwelling of pleasing design at West End, Chicago. J. De Howarth, architect, Chicago. Floor plans, perspective view, sheet of details, etc.
2. Elegant colored plate showing perspective view of a \$1,400 cottage at Chicago. Two floor plans, sheet of details, etc. Architect J. M. Young.
3. Design for an entrance hall.
4. An attractive dwelling at Hollis, Long Island, erected at a cost of \$6,000 complete. Perspective view and floor plans. Schwietzer & Diemer architects, New York.
5. A neat looking cottage at Humboldt Park, Chicago. Cost \$3,200. Photographic perspective view and two floor plans.
6. A colonial house erected for Mr. C. A. Hutchings, at Montclair, N. J. Cost \$5,000 complete. Floor plans and perspective elevation.
7. A Flemish cottage erected in Philla Park at Wayne Pa., at a cost of \$5,800 complete. Perspective view and floor plans.
8. A house erected at Elm Station, Pa., at a cost of \$5,200. Photographic perspective view and floor plans.
9. Perspective elevation and floor plans of a handsome cottage at South Orange, N. J. Charles B. Atwood, New York, architect. Cost \$13,000 complete.
10. Engraving showing a block of economical brick houses erected at Philadelphia, Pa. Cost \$2,000 each. J. M. Stillier, of Philadelphia, architect. Floor plans and perspective.
11. Perspective and floor plans of a Lake Side cottage at Minnetonka, Minn. Cost about \$4,000. W. H. Dennis, architect, Minneapolis.
12. Miscellaneous contents: Some of the merits of the ARCHITECT AND BUILDERS EDITION OF THE SCIENTIFIC AMERICAN.—The air supply.—The Alhambra.—Decoration of entrance hall, illustrated.—Questions on construction.—The Henry Martin brick machine, illustrated.—Buckeye Portland cement.—A government contract for woodworking machinery.—Architects' and carpenters' transit, illustrated.—Improved dwelling houses, illustrated.—Dumb waiter and hand power elevators.—Improved double blind wiring machine, illustrated.—An improved boiler for power and heating, illustrated.—Resistance to fire of wood posts.—An improved door spring, illustrated.—An improved hot air furnace, illustrated.—The Taylor "old style" roofing tin.

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For Sale.—New and second hand iron-working machinery. Prompt delivery. W. P. Davis, Rochester, N. Y. Acme engine, 1 to 5 H. P. See adv. next issue.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. For steel castings of best quality, write the Buffalo Steel Foundry, Buffalo, N. Y.

Best Ice and Refrigerating Machines made by David Boyle, Chicago, Ill. 155 machines in satisfactory use.

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

\$10,000.—Equal interest desired in established electric or metal manufacturing business. Address "Young Businessman," care this paper.

Wanted.—By a mechanical ingenious man, a situation with some manufacturer; can furnish capital. H. Appleton, 43 Milk Street, Room E, Boston.

The Holly Manufacturing Co., of Lockport, N. Y., will send a book of official reports of duty trials of their high duty pumping engines on application.

Guild & Garrison, Brooklyn, N. Y., manufacture steam pumps, vacuum pumps, vacuum apparatus, air pumps, acid blowers, filter press pumps, etc.

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.

Sheet Rubber Packing, 1-16, 3-32, 1/4, 3-16, and 1/2 inch thick, 7 1/2 cents per pound. All kinds of rubber goods at low prices. John W. Buckley, 156 South St., New York.

Manhattan packing is self-lubricating. It keeps the piston rods bright and smooth. Send for sample and price list to Greene, Tweed & Co., 83 Chambers St., N. Y.

Magic Lanterns and Stereopticons of all prices. Views illustrating every subject for public exhibitions, etc. "A profitable business for a man with small capital." Also lanterns for home amusement. 203 page catalogue free. McAlister, Optician, 49 Nassau St., N. Y.

Tools wanted for immediate delivery, new or second hand: one large boring machine for cylinders and fly wheels; one second hand multiple musket barrel drilling machine (low price); one slotting machine; two strong lathes; one steam or power hammer; Second hand traveling crane. Address X, Scientific American Office.

How I Got to Colorado.

Having read in several papers that they were giving away lots at Montrose, Colorado, I wrote and received the deed so promptly, that a large number of my friends at once sent, and after getting their deeds, they appointed me a delegate to visit Montrose; through the courtesy of the Colorado Homestead and Improvement Company I got a free ticket there and back. I had a lovely trip, and while there sold my lot for \$127.50. Any person can get one lot absolutely free, by addressing the Colorado Homestead and Improvement Company, Montrose, Colorado. By giving every third lot, they will bring thousands of people there. Montrose, the county seat, is a railroad junction, and a beautiful city of nearly 3,000, and will have ten thousand within a year. Their motto is "Get There, Boys," and certainly free lots and free tickets are sure winners. When property can be obtained free, why should not every one own real estate? S. S. N.—Elizabeth, N. J.

Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway, New York. Free on application.

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.

(2535) G. L. S. asks (1) how to mend an iron kettle, called porcelain-lined, a large one burnt off in the middle. A. This cannot be done. The new enamel would have to be of the same composition as the old, and any attempt would result in failure. 2. And would also like to have a receipt for a liquid stove polish. A. Mix 2 parts of coppers, 1 part of black lead, and 1 part of boneblack with water to give the consistency of cream. Keep in a tightly corked bottle. Apply with a brush.

(2536) L. J. O. asks: What are the proportions used in making a good emulsion of cod liver oil with phosphates of lime and soda, and what is the process of mixing them? A. Emulsion of cod liver oil with phosphates of lime and soda.

- Cod liver oil..... 8 fl. oz.
Mucilage of Irish moss..... 5 " "
Phosphate of calcium..... 128 grs.
" sodium..... 128 "
Sirup of tolu..... 1 fl. oz.
Alcohol..... 1 " "
Flavoring sufficient quantity wintergreen and oil of bitter almonds.
Water q. s. to make..... 16 fl. oz.

Dissolve the phosphate of sodium in the mucilage of Irish moss, and emulsify the cod liver oil with the lat-

ter. Then triturate the phosphate of calcium with the sirup of tolu; add the mixture to the emulsion; afterward add the alcohol and flavoring, and finally enough water to make the 16 fl. oz. Mix the whole thoroughly together.

(2537) T. J. McF. asks how granite-ware is made and what is used to make it. A. It is made on a basis of sheet iron. The goods are pickled in sulphuric acid, washed, and are dipped into a mixture of water and finely ground enamel, and are allowed to dry. They are then snow white in appearance, with some slight spots of rust showing through the coating. They are fired for about five minutes. This melts the enamel and the rust spots develop the mottling. The enamel is a glass that has been melted and poured into water and ground. Several meltings are advantageous. It contains soda, lime, silica, fluorspar, etc. The successful formula is in the nature of a trade secret.

(2538) W. M. writes: I am making a modified Wimshurst induction machine. I would like to know whether the tubular and solid shafts are brass or wood? Would a hard wood ring do in place of the vulcanite ring? A. The tubular shafts may be made of wood, and the solid one of brass or steel. Hard wood may be used for the ring, provided it is well dried and soaked in paraffine. 2. I also made an induction coil. I used naked wire, and it gives only 1/4 inch spark. Would No. 36 cotton-covered wire do, insulating each layer with the insulating cement mentioned in "Experimental Science"? A. Yes.

(2539) T. McA. asks (1) how to prevent soap from shrinking after it is cut into bars. A. By some of the additions prescribed below you may prevent it. One treatment is to allow the bars to shrink and warp, and when it is over to plane them straight. 2. What to put into soap to make it hard. A. Soap made with good fat and soda should be hard if too much water has not been used. It can be further hardened by having a limited quantity of a strong solution of sulphate or carbonate of soda crushed into the unfinished product after framing. About 5 per cent of the dry salts may be used dissolved in as little water as possible. Or 10 or 15 per cent of a 50° B. solution of silicate of soda may be added. 3. How to cut soap into three-quarter pound bars and stamp name into soap? A. Have the name in raised letters on the bottom of the frame. Cut with wires after setting. See Brand's "Manufacture of Soap and Candles," \$7.50, and Cristiani's "Technology of Soap and Candles," \$7.50, you will find much useful information on such points.

(2540) H. A. M. writes: 1. Could you tell me of a compound that when it is first used is thin enough to press in a small hollow and that would get hard like sheet rubber and as flexible, and that would preserve the impression? I wish to take an impression off lumber and to keep grain marks. A. Try a mixture of glue 10 parts, glycerine 2 parts. Soak the glue in water, dissolve by heat and add the glycerine. Oil the surface to be copied before applying. 2. Could you tell me how I could get a lasting impression on unvulcanized sheet rubber, without making mould out of plaster of Paris? A. Press against the surface well coated with talc powder and heat and again press. The rubber must be vulcanized, or prepared for vulcanization. Nothing can be done with pure, unvulcanized gum. See our SUPPLEMENT, Nos. 249, 251, 252.

(2541) H. B. says: Will you kindly settle an argument that has arisen in one of the machine works in this place? All the men in the room save myself say that the gibs on a planer head do not hold it from dropping. One man says that he cannot do a fine job on a planer that has any lost motion in the screw, says that the head will drop and cause the tool to dig in. I say that I can take the rejected planer or any other and do any ordinary job in first class shape with the down feed screw taken out of the planer. A. We have done some very good work on a rickety planer, which does not waive our admiration for a perfect tool. What your shopmates say they cannot do may be true, and what you say you can do may be also as true. There is much in knowing how to do good work with poor tools.

(2542) L. W. K. asks: How can I take the rust out of a nice breech-loading shot gun? There is not very much in it, but coal oil will not do any good, and some others that I have tried. A. You cannot entirely remove the roughness caused by rust in the gun. Clean to an even surface with a wooden ramrod with a plug end that just fits the bore, using tripoli and oil on the plug.

(2543) G. C. S. writes: 1. I have two 12 inch board rubber triangles which were accidentally exposed to the rays of the sun for a few minutes and were considerably warped. How can I make the edges straight again and also preserve the right angles? I am not so particular about the other angles. A. Heat slightly and press into shape between two boards. You can ascertain the degree of heat needed by trial. Use a little at first and increase until the straightening is effected. Heat in warm water. 2. Can you recommend a good book on railroad surveying, for a beginner? I understand land surveying, also trigonometry, etc. A. We recommend Byrnes "Pocket Book for Railroad and Civil Engineers," price \$1.75, which we can supply.

(2544) C. B. says: I would like to ask you if you can tell me the difference between high pressure engine and low pressure. A. A high pressure engine runs by the direct pressure of the steam only. In a low pressure engine the exhaust steam is condensed with water or otherwise and a vacuum formed in front of the piston, adding from 13 to 14 pounds per square inch to the power of the piston.

(2545) F. A. M. asks: How can I ascertain the length of the radius (without laying off) of the arc, the length of the chord and distance between the middle of arc and middle of chord being given? A. See query No. 2495, in SCIENTIFIC AMERICAN, October 11, 1890.

(2546) A. B.—The silver medal found in the prairie in Sioux County, Iowa, is one of those given by George III. to the Indians who assisted him in the

revolutionary war. They are quite often found among the descendants of those Indians and are, as in this case, sometimes dug or plowed up. It is worth about \$7.50.

(2547) J. S. J. asks how to make the bright red sealing wax. A. Melt at the lowest possible heat 4 ounces pale shellac in a bright copper vessel, when fluid mix in with it 1/4 ounce Venice turpentine warmed a little and next add 3 ounces of best vermilion. Mix thoroughly, using as little heat as possible. Some artists use a little alcohol to the shellac.

(2548) B. W. S. asks: 1. Please give me a formula for the lens in an amateur enlarging camera for Kodak negatives. Also the price of the same. A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 451. Manufacturers of photo. apparatus sell special enlarging cameras. Cost \$25 to \$30. 2. Give date or number of query in which the hydroquinone or ekonogen developer is described. A. See SUPPLEMENT, No. 621, for hydroquinone developer. For ekonogen, see SCIENTIFIC AMERICAN, September 21, 1889, and April 26, 1890. 3. Where can it be procured? A. Both can be obtained from photographic dealers in your vicinity. 4. What is the best lubricant for the commutator of an Edison machine? A. An occasional wiping with a cloth moistened slightly with oil is all that is necessary. 5. What is the best size of wire for the simple electric motor (Experimental Science) for 110 volts? A. Use No. 20.

(2549) Determining the Radius of an Arc.—In the Notes and Queries column, query 2495, of your issue of October 11, G. A. S. gives this rule for finding the radius of an arc when its chord and rise are given: "To four times the square of the rise add the square of the chord, and divide this sum by eight times the rise." This is correct enough, no doubt, as you say, but the quantities are needlessly large. Is not the following a simpler solution? Half the given chord is evidently the sine of half the arc. The "rise" is the versed sine of this arc, which subtracted from the radius is of course equal to the cosine. Now, by the "pons asinorum,"

sin^2 + cos^2 = ra^2 or sin^2 + (rad - versin)^2 = ra^2

Reducing this we obtain

sin^2 + versin^2 rad = 2 versin

i. e. To the square of one half the chord add the square of the rise, and divide the sum by twice the rise.

REV. CLARENCE E. WOODMAN, PH.D.

New York, N. Y.

(2550) C. P. B. asks: Will you please give the rule for ascertaining the amount of curvature for any given distance on the surface of standing water or other perfect level? How far can the light on the statue of Liberty be seen? How far ought it to be seen from the deck of a vessel 20 feet above the water, in clear weather? I have seen it positively stated that on the Irish Sea the red light on Holyhead pier and the two bright lights at the Poolbeg lighthouse are both distinctly visible at the same time from a point midway between them though they are sixty miles apart; will you give their respective heights, and also state if you know anything about the facts in the case? What is regarded as the most conclusive evidence of the sphericity of the earth? I understand that there is a society in England that denies that the earth is a sphere; indeed, I have even met one or two of their disciples in this country. They seem to be people of ordinary intelligence upon all other questions. They are full of so-called facts which are in conflict with the accepted idea of the shape of the earth. The statement about the two lights on the Irish Sea is from one of their publications. It is also claimed that the light on the statue of Liberty can be seen ninety miles. A. Rule for curvature of the earth: Divide the square of the distance in feet by the equatorial diameter of the earth in feet—41,852,124; or a more simple one for ordinary purposes: Two thirds of square of distance in statute miles equals the curvature in feet. The horizon of the light on the statue of Liberty is about 22 miles, and should be seen from the deck of a ship at 25 miles. We have no data as to the heights of the Holyhead and Poolbeg lights. Each should be over 400 feet above the sea to be both seen at midway with ordinary refraction. Probably, if the height is less than 400 feet, they have only been seen under conditions of extraordinary refraction in the atmosphere. The curvature of the earth, or depression of the horizon in every direction, as seen from high mountain peaks in the ocean, and the changes in latitude of sun, moon, and stars, as seen from different parts of the earth, are conclusive evidence of the sphericity of the earth. The light on the statue of Liberty may have been seen from some mountain 90 miles distant under extraordinary refraction. We give the statements of the flat earth society a very wide margin of doubt.

(2551) J. C. L. asks: 1. What would be the pressure attained by compressing the air in a cylinder, 20 by 5 inches inside measurement, down to 15, 10 and 5 inches, beginning with the air nominal? A. You would have 7 1/2 pounds, 15 pounds and 30 pounds pressure at the proportions stated. 2. Would 70 pounds pressure on a one inch pipe be sufficient to attain a pressure of 30 pounds on a three inch cylinder? A. If pressures are per square inch, the cylinder would have 7 by 70 or 490 pounds on the piston. 3. Would a machine operated by springs be considered a perpetual motion, the springs worked by power furnished by themselves? If so, what ought such an invention bring if for sale? A. We have very little faith in the fact of a perpetual motion being offered for sale. We wish to see the perpetual motion first.

(2552) F. G. M. asks: What are the conditions requiring a division in an original invention where it applies to one commodity and is the invention of one person? A. Where two or more devices that can be separately used are claimed in one patent, the Patent Office generally requires a division and the taking of separate patents. For example, if the invention relates to a vehicle, and one claim is made for the hub, another for the seat, another for the spring, in such cases division is required.

(2553) W. W. asks: Will you kindly give me directions, in Notes and Queries column of SCIENTIFIC AMERICAN, for measuring primary batteries? A.

We refer you to works on electrical testing, such as Kempe's "Manual of Electric Testing," \$5, or Kempe's "Electrical Engineer's Pocket Book," \$2.

(2554) G. R. asks how to silver a piece of plate glass to make a mirror. A. Spread a piece of pure tin foil on a marble slab, pour mercury over it until it is quite deep, slide your perfectly clean glass over it, keeping the front edge below the level of the amalgam, press with a heavy book, and after a day stand on edge to drain for a couple of days.

(2555) P. J. T. writes: I have a large mirror, and lately it became spotted all over; it looks muddy. I first thought it was on the front of the glass. It was, but I found out afterward it was on the back. Could you give me a receipt to fix it, and would it be possible for me to coat the back without sending it away to a factory, that is, if it needs it? A. We strongly advise you not to attempt to repair it. Send it to a factory if they will undertake it. Often such a trouble cannot be satisfactorily dealt with. 2. How is mercury applied? A. See preceding query. For silvering glass consult our SUPPLEMENT, Nos. 105, 121, and 206.

(2556) T. W. H. asks: 1. How can paraffine be hardened? A. It cannot be hardened. 2. What is heel ball made of? A. Melt together beeswax 1 pound and suet 4 ounces, stir in very finely powdered ivory black 4 ounces, and lamp black (sifted) 3 ounces, gum arabic and rock candy very finely powdered, of each 2 ounces. When thoroughly mixed, pour into mould.

(2557) G. K. R. asks (1) for a formula for a cement that will firmly weld two or more thicknesses of cotton cloth, interfering the least possible with its flexibility. A. Try 5 parts of glue softened in water and mixed with 1 part of glycerine and heated to solution. 2. Some solvent that will prevent common commercial rubber cement setting so quickly. A. Add more naphtha, or rather a high evaporating point.

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

October 21, 1890,

AND EACH BEARING THAT DATE.

(See note at end of list about copies of these patents.)

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