[For the Scientific American.]

A LIGHT UNIT.

BY JOHN C. DRAPER, PROFESSOR OF CHEMISTRY, UNIVERSITY MEDICAL COLLEGE, NEW YORK.

The measurement of the intensity of artificial light is one of the problems that has not been satisfactorily solved, though many able physicists have given it their earnest attention.

Among the instruments that have been contrived to accomplish this result is the chlor-hydrogen photometer, first introduced by Professor J. W. Draper, and afterwards modified by Bunsen and Roscoe. Though this instrument is very beautiful and philosophical in its action, it is open to the objection that it measures rather the chemical or actinic than the illuminating power of a flame. The polariscope photometer of Arago, and the electro-photometer of Masson, are also very ingenious instruments; but the difficulties attending their use have, thus far, prevented their introduction.

The photometer generally employed is that of Ritchie or of Bunsen, and especially the latter. The principle involved in its action is the determination, by well known means, of the relative brilliancy of two lights, one of which is supposed to be invariable. Heretofore, the invariable light, or unit, has been a flame produced by a candle, which is defined as "a sperm candle of six to the pound, burning at the rate of 120 grs. per minute." With this the second flame is compared; and, if it is ten or fifteen times as strong, it is spoken of as being a ten or fifteen candle light.

Though this method is reliable in theory, in practice it is open to error, owing to the variability of what should be the invariable light or unit. If we could always obtain sperm candles possessing the same composition, the indications might be received with a certain degree of reliance; but when we remember that, at present, the so called sperm candles are made of different materials, in different proportions, we see how little confidence is to be placed on a light unit of this description; and it is the object of this communication to detail the results of an attempt to obtain a reliable and invariable light unit.

It is evident that, if a given solid is heated to a certain temperature, it will emit a light of a definite or corresponding intensity. At the same time, the solid will undergo a certain expansion which may be employed to indicate or measure the intensity of the light emitted. I therefore arranged a fine platinum wire so that it was heated by a Bunsen flame, and the amount of expansion and equivalent light determined. It was soon found that, though the arrangement was very well in theory, the practical difficulties in its construction and mode of action were such that it would not answer. I consequently resorted to the following modification, in which measurements of expansion of the wire are not necessary:

A flame of pure dry hydrogen, burning at a definite rate, was caused to impinge upon a platinum coil, when it was found that, so long as wire of the same diameter was used in constructing coils of the same dimensions, the latter, on being subjected to hydrogen flames issuing from burners that were similar in all respects, always emitted a light of the same intensity.

The dimensions of the coils and burners employed in my experiments were as follows: A platinum wire, one decimeter in length, and weighing twenty-five centigrammes, was wound into a close spiral coil of five turns, four millimeters in diameter on the outside. The remainder of the wire was then turned up parallel to the axis of the coil, and terminated in a hook by which it was suspended over the hydrogen flame.

The burner presented a circular opening, one millimeter in diameter. The platinum spiral was suspended over this so as nearly to touch it, and the supply of hydrogen regulated to produce a flame which kept the whole coil at a white heat.

Such an arrangement is easily reproducible in any locality, and when the rate of combustion of the hydrogen is the same, it must necessarily emit a light of the same brilliancy; it consequently provides a light unit, which meets all the conditions of the problem.

The want of intensity in the above described light unit may be urged as an objection, but it is rather an advantage than otherwise, when lights of low intensity are to be examined. If the brilliancy of the light to be measured is very great, any objection on this account is easily remedied by determining the value of an ordinary gas or candle flame in the above light unit, and employing it as an intermediate unit of comparison, from which the value of the brilliant light may be calculated in the proposed light units.

Among the advantages gained by such a light unit is the elimination of errors arising from the variation in the light giving power of the volatile hydrocarbons, produced in the combustion of a candle. According to Dr. Frankland, the luminosity of such flames depends—not on the incandescence of solid particles, but on the luminosity of the gases or vapors produced in the flame during combustion. Since the composition and luminosity of these gases must vary greatly with the temperature, rate of combustion, and nature of the material composing the candle, it is evident that there must be similar variations in the brilliancy of the resulting flame. The use of an incandescent solid, as the platinum wire, avoids this and other sources of error, and reduces the conditions for the production of the light unit to the simplest state.

Tunnel between England and France.

Another project for a submarine roadway under the English channel has been mooted, and a committee of engineers has approved the plan, which is the production of a Frenchman, M. Thome de Gamond. There is novelty in the scheme. It is proposed to tunnel under the channel between New Haven and Dieppe where the distance between the two countries is 64 miles, in preference to between the South Foreland, near Dover, and Cape Grisnez. near Calais, where it is only twenty miles. The reason for this choice of locality is not apparent.

Sheehan's Patent for Steelifying Iron.

In another column we publish the story of Thomas Sheehan, and how he happened to make an invention by which he has accumulated a fortune. Annexed is a list of the railroad companies who are using his process for steelifying iron, and the amounts paid for the privilege:

Chicago & Northwestern	$3,500
Michigan Central	1,500
Chicago, Burlington, & Quincy	2,000
Atlantic & Great Western	1,900
Pennsylvania Central	4,000
Pittsburgh, Fort Wayne & Chicago	2,000
Central, of New Jersey	1,200
Camden & Amboy	1,200
Little Miami, Columbus, & Xenia	800
Schenectady Locomotive Works	500
Chicago, Rock Island, & Pacific	1,200
St. Louis & Iron Mountain	800
North Missouri	800
Lake Shore & Michigan Southern	4,000
Vandalia, Terre Haute, & Indianapolis	950
St. Louis & Indianapolis	800

A number of other railroad companies are using his invention, that have not yet settled with the patentee, but who acknowledge their liability; and still others, against whom suits have been brought in the United States Courts, which have not come to trial. A judgment has been obtained against one of the companies very recently for $12,800, which has not been settled.

IT is a shameful thing to be weary of inquiry, when what we search for is excellent.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

LAMP.—Dr. Franklin T. Grimes, Liberty, Mo.—The invention relates to the class of lamps in which a tube or funnel is combined with the bowl, the said tube or funnel extending from the top of the bowl of the lamp down to within a short distance of the bottom of the same, whereby the bowl is converted into a fountain reservoir, in which, when it is filled, there is a vacuum formed above the surface of the oil or liquid, which is consequently maintained at a higher level than it is within the lower mouth of the said tube or funnel where it is subject to atmospheric pressure. The invention consists mainly in a peculiar arrangement of the valve apparatus, whereby certain advantages are attained in the regulation of the supply of oil to the wick tubes, in filling the reservoir, and in other operations incidental and necessary to the use of the lamp.

INSECT TRAP.—Thomas Wier, Lacon, Ill.—This invention relates to the use of two or more pieces of wood, of any form or size, and fastened together in any way, and either with or without cracks, slits, or crevices made in them, said pieces being intended to be placed among the branches of fruit trees, or on the ground near fruit trees, and to serve as a trap for the larvæ of moths, and other noxious insects,

HANDLE STRAP FOR TRAVELING BAG.—Arthur Alexandre, of New York city.—To the frame of a traveling bag are attached rings, which are preferably made square, as allowing the strap to be passed through them more readily. The strap is made of sufficient length to adapt it to serve as a shoulder strap, and may be made in one piece, or in two pieces connected by a buckle. The ends of the straps are passed through the rings, and are secured to the body of the strap by a button, by sewing, or by other convenient means. To the strap, at a distance from its ends equal to about one third the distance from the ends to the center of the straps, are attached two hooks. The middle part of the strap is made double by having the ends of a short strap attached to it, and has holes formed in the lower ply to receive the hooks. To adjust the handle strap for use as a handle, the hooks are passed inward through the rings and brought upward along the under side of the strap, and hooked into the holes in the lower ply of its double middle part. To adjust the strap for use as a shoulder strap, the hooks are unhooked, and the strap is drawn out to its entire length. Keepers or slides are placed upon the strap, near the hooks, and, when the strap is extended for use as a shoulder strap, are slipped over the hooks to cover them and keep them from catching upon anything with which the strap may come in contact.

FLAG HALYARD.—William Albert, Brooklyn, N. Y.—This invention relates to an improved manner of securing flag halyards; and it consists in attaching them to a weight or traveler fitted on a rod or guide attached to the royal backstays of a ship or other convenient place, or to the flag staff near its base, so that it can rise and fall as the halyards vary in length according to their condition of dryness, thereby always keeping them taut but not overstraining them, as they will be if made fast when becoming very dry and then becoming wet. This plan will not injure the halyards, while it will always keep them taut and trim. In the common way, they will sometimes be altogether too slack, and at others so taut as to be broken by the strain.

THILL COUPLING.—Coleman Bridgman, St. Cloud, Minn.—The object of this invention is to furnish a simple, convenient, and safe coupling for thills of buggies, wagons, etc. It consists in a jointed coupling pin and slotted ear, and also in a slotted washer, arranged to form a simple, durable, and perfectly safe coupling, without screws or spring, that can be adjusted without hammer, wrench, or other tool, without trouble, and in an expeditious and easy manner.

WASH BOILER.—Silas Bennett, Newcastle, Pa.—This invention has for its object to furnish an improved boiler for washing clothes, which shall be so constructed and arranged as to distribute the circulating suds evenly over all parts of the clothes, so as to wash the clothes evenly and avoid staining them, as is the case where large streams of suds are discharged continuously in one place. It consists in the construction and arrangement of the various pipes and distributing tubes, with a flanged and perforated bottom, vertical and cross strips, constructed and arranged in connection with each other, to accomplish the purpose set forth.

FAN MILL.—Alexander Plymate, of Blue Earth County, Minn., administrator of Franklin H. Plymate, deceased.—This is an improvement in fan mills, which consists in a peculiar construction of the feed board, and in the use of a two part shoe for the support of the sieves, the parts being arranged in a peculiar manner, to make the machine effective and compact.

COUPLING HOOKS FOR COAL CARS.—Frank Bush, of Boonton, N. J.—In the ordinary coupling hook the inner link is passed through a hole in the forward part of the shank of the hook, and is then welded, so that when it is necessary to repair or renew the link, the entire hook has to be detached from the car and taken to the shop, where it requires at least three men to handle it upon the anvil while the link is being welded. To avoid this inconvenience and expense, the inventor forms a second or inner hook upon the shank of and just inside of the outer hook. The point of the inner hook extends back parallel with the shank of the outer hook, so as to enter a hole in a plate on the end of the draw bar. By this construction, by loosening the hook, the coupling link or ring may be readily placed in or removed from the inner hook, and when the hook is again drawn to its place it will be impossible for the link or ring to become detached.

Answers to Correspondents.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however when paid for as advertisements at 1·00 a line, under the head of "Business and Personal."

ALL reference to back numbers must be by volume and page.

COIL IN BOILERS.—In answer to M. S. M., in relation to coil in boiler, I would say that his plan of heating water is not practicable. The sudden contraction of his coil, when the water supply is turned on, will start any joint he can put in. I have tried 2½ inch wrought pipe (very heavy), running it through fire box, over bridge wall to back end of boiler; the pipe 8 feet long would contract 1 8-12 inches, as soon as water was turned on, and of course start a joint or burst the connections. If S. W. will use a heater of 5 inch pipe, such as is used for casing oil wells, say 10 feet long, and put in six lengths of 1 inch pipe, using return bends, and let his exhaust steam heat his water, he will be on a sure safe footing; and if he has it arranged so as to have a steady continuous feed on his boiler, so much the better, for he will use less fuel and have no explosion. —E. A., of Pa.

EXTERMINATING RATS AND MICE.—I saw an inquiry, from one of your readers, how to exterminate rats and mice. One of the best remedies I have used is an equal mixture of flour and plaster of Paris. It is preferable to poison, because it will not hurt cats when catching them. —F. S., of Pa.

FLOATING OF SOLID IN MOLTEN IRON.—Permit me to suggest, in answer to S. H. W., that the probable cause, of cold iron floating on melted iron, is the attraction of cohesion in the latter. Light pieces of metal, such as a piece of fine wire, a small sewing needle, or a flat piece of sheet lead will float on water, and the only satisfactory reason of its doing so which occurs to me is, that the attraction of the particles of water for each other is sufficient to resist the passage of such light objects through its surface.—W. J. B.

J. R., of Slippery Rock, Pa.—The mineral you send appears to be an earthy carbonate of iron, and should be assayed to determine its value. It would be of interest to know how it occurs, whether in beds or veins, in either case how thick, as well as the direction and amount of dip; the associated rocks, above and below, whether shale, limestone, etc.; whether reddish nodules, or lumps of an iron ore with concentric coatings, occur in the vicinity.

WHAT MUST I DO?—When botches want to borrow my nice tools, and when I will not lend them, they call me names. Must I stand and take it, or lend the tools?—J. P. W.

Answer.—Read the Beatitudes, Matthew V., 10, 11, and learn the blessedness of persecution.

J. I. M., of Pa.—Relatively to the axle, all parts of a rolling wheel move with an uniform velocity. Relatively to the plane upon which it rolls, the advance movement of the top of the wheel is temporarily greater than that of the bottom; but as all parts of the perimeter are successively top and bottom, the average advance of each part is equal.

A. J. H., of Mass.—All else being equal, the mechanical powers of screws are relatively as their pitch, or the number of threads to the inch on each, without respect to their diameters; but the larger the diameter of the screw with a given pitch is, the less is its friction in working, owing to the reduction of the inclination of the thread. A screw of larger diameter will raise greater weight without stripping the thread, than one of smaller diameter with equal pitch. For these reasons, to make an easy working and durable screw, it is better to make them of larger rather than of smaller diameter.

G. K., of N. Y.—Friction does not increase with the increase of surface, but—with some slight variations, not yet fully accounted for,—directly as the pressure of the rubbing surfaces against each other. This answer refers to the static or fixed force required to overcome the friction of bodies, and not to the power consumed in overcoming it for a given space of time, which will be as the coefficient of friction in pounds, multiplied by the space it overcomes in each minute of time; this will be expressed in horse power by the quotient obtained in dividing the product by 33,000.

G. L., of Minn., sends us a bit of maple branch, containing a peculiar insect, nicely housed therein, and asks what the bug is. It is a Hymenopter, one of the "wood-wasps," as the Germans call them, or "horn-tails." The long horny borer at the end of the body, contains two fine, serrated needles for boring holes, in which they deposit their eggs. This species is the *Tremex columba*, and usually infests the elm, buttonwood, and pear. The grub or larva is yellowish white, about an inch and a half long, with a horn on the hind end.

J. C. C., of Pa.—Your mineral specimen is simply hornblende —of no use in the arts.

C. D. A., of N. Y.—The subject of balancing cylinders was treated at great length in Vol. XIII. of the SCIENTIFIC AMERICAN, and we do not wish to reopen it at present.

C. B. R., of N. B.—The draft of a furnace might undoubtedly be greatly improved in the manner described.

HINDRANCE TO THE FLOW OF WATER THROUGH PIPE.—J. R. B., query 17, page 187, says the descent in his pipe is even, but I presume an accurate profile would show a slight depression at some point, perhaps at the spring. A depression equal to the diameter of the bore would be sufficient to prevent the air from escaping at the upper end; and if the current is not rapid enough to carry it through, it will remain, and its accumulation is virtually so much subtracted from the fall, thus retarding the flow. When the hight of the column of confined air becomes equal to the difference of level between the spring and the discharge—that is, when its lower end reaches as much below the level of the discharge as its upper end is below the level of the spring,—the water pressure becomes equalized, and the flow stops. The remedy is very simple. Make a small hole or leak in the top of the pipe, at the summit, or highest point below the depression, and leave it open permanently for the escape of the air.—O. A. B., of N. Y.

GAS FOR TOY BALLOONS.—C. B. S. can make this gas by pouring slightly diluted muriatic acid upon an equal weight of zinc, in a covered vessel having a small tap or stop cock in the top for filling the balloons. The vessel should be made of lead, to prevent corrosion. It is impossible to estimate the amount of material, as the balloons generally vary greatly in size. He should be very careful with the gas; it is highly inflammable.—C. O. I., of Pa.

SKELETON LEAVES.—J. V. M., query 3, October 14, will find that strong vinegar will destroy all the pulpy matter of leaves, without injuring the fibrous parts. Leaves with woody fibers, such as those of the different species of ivy, require to be left in the vinegar for a fortnight or longer. The skeletons can be bleached by chlorine gas, of which commercial chloride of lime is the most convenient preparation for the purpose.—D. B., of N. Y.

ARTIST'S CANVAS.—J. T. M. C. can make a very cheap canvas by stretching a sheet of damp paper on a pane of glass or board, and, when partially dry, pasting on it four or five pieces of thin muslin, each piece being allowed to dry before another is put on; and all must be stretched very tight, and rubbed smooth. The paste should be made of isinglass rather than flour. Then cover it with white lead, using as little as possible, putting it on with a knife. After several days, give it a coat of paint and stipple it with a blender to give it a tooth. Leave it on the glass till the picture is finished.—E. S. S., of ——.

FORCE OF FALLING BODIES.—Let me inform J. E. that: As the accelerating influence of gravitation upon a falling body, and its retarding influence upon an ascending body, are equal, the force of the blow struck by the falling body, if all the force could be utilized, would be exactly enough to raise the body again to the place from which it fell. Hence, to find the force of a falling body, multiply its weight, in pounds, by the hight in feet from which it has fallen, and you have the force in foot pounds. And it may interest J. E. to know further that to find the striking force of a body moving in any direction, he may use the following formula: Divide the velocity, in feet, per second, by 8 (or, for greater accuracy, 8·04), and multiply the square of the quotient by the weight of the body. This gives the striking force in foot pounds.—W. H. P.

AQUARIUM CEMENT.—C. E. G. wishes to know how to make aquarium cement. Here is a receipt, which I think is good, taken from a newspaper: Take one part, by measure, of litharge, one of plaster of Paris, one of fine beach sand, and one of finely powdered rosin. When wanted for use, make into putty with boiled linseed oil.—E. M. D.

CORRECTION.—In publishing my answer to D. D. D., of N. Y., you made me say, "better not use back gear," or something near this: it should read: "better use back gear." It is essential that the speed be slow.—W. W. T., of N. Y.

INK STAINS ON LEATHER.—H. S., query 4, September 30, should try oxalic acid, or the so called salts of lemon. I have used the former, but it varies in its effect upon different leathers.—D. B., of N. Y.

HEATING SURAFCE OF BOILERS.—C. & H. A., query 1, Oct. 14, will find the following to be the proper proportions: For locomotive boilers, there should be about 80 square feet for each square foot of grate bars, and, on each square foot of grate bars, about 1 cwt. of coke or coal should be burned per hour. In stationary boilers, the number of square feet of heating surface required to evaporate a cubic foot of water per hour is about 70, in Cornish boilers; and the heating surface, to each square foot of fire grate, should be from 13 to 15 square feet in wagon boilers, and 40 square feet in Cornish boilers.—D. B., of N. Y.

BUGS ON PLANTS.—Insects and lice, infesting plants, may be effectually destroyed by the application of white hellebore in fine powder. —C. T., of Vt.

TENDER GUMS.—If your correspondent, W. W. G., will use common salt and a soft brush, when cleaning his teeth, his gums will soon get hard.—J. B. N., of Ohio.

TABLE CUTLERY.—The worst agent now known for the destruction of table cutlery, is the steel knife sharpener, recently invented, and in general use. I have been obliged to discard it, and to use the grindstone, as formally, and have no further trouble with my knives.—C. T., of Vt.

GRINDING CLAY.—Answer to D. H. S., Jr., query No. 15, Aug. 26. The means required are a pair of rollers, horizontally fixed on a substantial bed three or four feet in hight. One roller must travel faster than the other. A trough, with scrapers to throw down the detached clay, with suspended weights attached, will also be required.—J. M. Mc., of —.

CLOTH FOR BRICK HACKS.—D. H. S., Jr., query 16, August 26. Oil cloth or felting is used for this purpose, and should be nailed to strips of lathing, or better still, to iron strips bent at right angles, with a string to hook on to the bottom board of the hack.—J. M. Mc., of ——.

BURNING BRICK WITH WOOD.—D. H. S., Jr., query 17, August 26.—It is difficult to answer this query, without knowing the class of clay. J. M. McC., of ——.

Queries.

[*We present herewith a series of inquiries embracing a variety of topics of greater or less general interest. The questions are simple, it is true, but we prefer to elicit practical answers from our readers.*]

1.—TEMPERING SMALL STEEL GOODS.—How can I temper a piece of steel about four inches square and three fourths of an inch thick, with two holes in it, so as to keep the holes in shape, and the steel from cracking while tempering?—M. C. M.

2.—LINSEED OIL STAINS.—How can I take linseed oil stains out of rough cut stone or granite, without leaving any marks on the stone?—M. C. M.

3.—VARNISH FOR WALNUT FURNITURE.—How can I varnish old walnut furniture after rubbing it down with pumice stone? I get the surface smooth and clean, and apply varnish; but when it has dried, I find that it runs into holes as if the wood absorbed it in places. What filling can I use before varnishing? And how can I treat walnut so as to cave a bright gloss, without polishing with shellac polish?—M. C. M.

4.—CEMENT FOR IRON AND LEATHER.—What kind of cement shall I use to faeten leather covering to iron pulleys, for running band saws upon?—E. D.

5.—PASTING GLAZED PAPER.—Is there any substance which will destroy the acid in flour paste, and further the drying of it when used on glazed paper? I think the acid and slow drying destroy all the glaze on paper. I have used hot and cold glue, gum arabic, and gum tragacanth, but they are too expensive for general use.—F. S.

6.—MARBLEIZING SLATE.—What is the process and the kind of material used for marbleizing slate? Is the art common to the public, or is it secured by patent? Has the patent expired?—T. S.

7.—CLEANING ZINC.—How can I clean zinc in ice chests to bring it back to its original color? What shall I use, and how shall I use it?—W. H. W.

8.—BUTTER WEED FOR PAPER MAKING.—Will some one of your readers inform me if the weed known as butter weed (which grows spontaneously upon all of our new rich lands to the extent of three to four tuns per acre) can be used for the manufacture of paper, or for any other purpose? If so, what is the probable value per tun?—W. M. B.

9.—AEROSTATIC TOY.—A neat toy is often constructed thus: Take a large currant, thrust a pin through its center, place it carefully upon the upper end of a dandelion stem or other small tube, holding the other end in the mouth, blow a strong, continuous blast, and the currant will remain suspended in the air as long as you continue to blow, even when the tube is considerably inclined from the perpendicular. What is the explanation? Has the principle, upon which it depends, been applied to any practical purpose?—H. T.

10.—IMITATION AMBER COMB.—Can any one give me the *modus operandi* of making such an imitation?—S. B. I.

11.—CONTENTS OF A PYRAMID.—Is there any rapid method of computing the number of cannon balls in a triangular pyramid?—T. G. T.

12.—FALLING BODIES.—T. E. N. E., of Mass., in answer to query of J. E., Sept. 2d, gives: T equals the square root of Q S divided by G: as a formula applicable to falling bodies, in which Q equals the quantity of matter. Will he explain what the quantity of matter has to do with a falling body, apart from its momentum, especially in a vacuum? He speaks of space, velocity, quantity, and time without designating whether he means feet or inches, minutes or seconds, pounds or tuns; and in case J. E. gets a single one wrong, the formula will mislead him.—H. A. W.

13.—STAINS ON GILDING.—I have got a French gilt mantelpiece clock on which are a number of spots, which look like verdigris. Can any of your numerous correspondents tell me how to get rid of these? The clockmakers I have taken it to say they can do nothing with it.—A. M

14.—CLEANSING THE HAIR.—What is the best method of cleansing the hair of gum or dirt, without injury to the hair or scalp? This is asked by many engineers who are often compelled to work all the week and late on Saturday night, making a visit to the barber impossible. Also what preparation is commonly used by barbers for shampooing?—H. L. J.

15.—VINEGAR FROM SOUR ALE.—Can any of your correspondents give me a good recipe for making sour ale into vinegar?—C. H. F.

16.—BACK PRESSURE IN EXHAUST PIPE.—We run our exhaust steam from a 150 horse Corliss engine, through 1,200 feet of five inch steam pipe. The pipe runs from one end of the dry house to the other twelve times, the turns being made by elbows of the same size as the pipe. At the end the steam is allowed to exhaust in the open air without any check. Query—Is there any appreciable back pressure? If so, how much? —J. W. H.

17.—ALLOY.—How can I make an alloy that will melt at 1,000 degrees, which will possess sufficient strength to make a steam cylinder, three inches in diameter, to withstand a pressure of fifty pounds?—J. B. N.

18.—PROPORTIONS OF STEAM BOILER.—If a steam boiler of four feet diameter and one fourth inch plate will stand a pressure of sixty pounds, is it not reasonable to conclude that a bhiler one foot in diameter and one sixteenth inch plate will stand the same strain with equal safety?—J. B. N.

19.—PRESERVING SHINGLES.—Can any one furnish a recipe for a wash to apply to shingles to prevent decay?—J. M. G.

20.—PROPORTIONS OF CYLINDER.—Can any one solve the following problems: Given the hight and number of gallons of a cylindrical vessel, to find the diameter. Given the diameter and number of gallons of a cylindrical vessel, to find the hight. Given the area of a circle, to find the diameter (in feet and inches). —W. G. N.

Declined.

Communications upon the following subjects have been received and examined by the Editor, but their publication is respectfully declined:

BOILER EXPLOSIONS.—C. E. G.—W. M.
CANAL BOATS.—W. W. R.
COIL OF PIPE.—B. G.
ETHER CONTROVERSY.—C. T. J.
INFLUENCE OF COLOR IN DEVELOPING LIFE.—C. F. P
METAPHYSICAL ARTICLES.—F. G.
NARROW GAGE RAILWAYS.—J. P.
PAINE'S ELECTRO-MOTOR.—S. J. K.
PROPERTY IN INVENTIONS.—J. E. S.
SELF-ACTING BLOWPIPE.—W. J. C.
THE GULF STREAM.—J. P. W.

Official List of Patents.

ISSUED BY THE U. S. PATENT OFFICE.

FOR THE WEEK ENDING OCTOBER 10, 1871.

Reported Officially for the Scientific American.

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119,684.—HARNESS.—I. H. Alexander, Newfield, N. Y.
119,685.—STEAM ENGINE.—J. F. Alexander, Shelby, N. C.
119,686.—TREADLE.—R. N. Allen, Pittsford, Vt.
119,687.—POTATO PLANTER.—L. A. Aspinwall, N. Y.
119,688.—BED.—F. P. Baldwin, C. T. Segar, Utica, N. Y.
119,689.—SPIKE MACHINE.—M. Belknap, Philadelphia, Pa.
119,690.—SEWING MACHINE.—R. Blees, Brooklyn, N. Y.
119,691.—HEEL.—E. P. Bray, Elizabeth, N. J.
119,692.—SADDLE BOX.—W. H. Brough, Coatesville, Pa.
119,693.—ROLLING MILL.—W. H. Brough, Coatesville, Pa.
119,694.—EVAPORATOR, ETC.—F. G. Butler, Bellows Falls, Vt
119,695.—TURNING, ETC.—R. M. Clapp, Vergennes, Vt.
119,696.—SAW FRAME.—W. Clemson, Middletown, N. Y.
119,697.—HARNESS.—C. H. Drury, Osceola, Ill.
119,698.—CANOPY.—J. Ellisdon, Liverpool, Eng.
119,699.—LIQUID METER.—N. Finck, Elizabeth, N. J.
119,700.—SAUSAGE STUFFER.—C. Forschner, New York city
119,701.—SAWING MACHINE.—J. Groat, Peru, Ind.
119,702.—BENDING WOOD.—Gustaf Gustafson, Chicago, Ill.
119,703.—IRONING TABLE.—C. C. Hardy, Rutland, Vt.
119,704.—RAISIN SEEDER.—J. Harrington, New London, Conn.
119,705.—CUSPADORE.—E. A. Heath, New York city.
119,706.—CUSPADORE.—E. A. Heath, New York city.
119,707.—POLISHER.—C. H. Helms, Poughkeepsie, N. Y.
119,708.—CLOTH PRESSER.—P. Howe, Boston, Mass.
119,709.—WATER METER.—H. J. Hyams, Pittsburgh, Pa.
119,710.—INLAYING.—J. W. Hyatt, Jr., Albany, N. Y.
119,711.—STAPLE MACHINE.—W. Malick, Erie, Pa.
119,712.—HARVESTER.—L. J. McCormick, W. R. Baker, Chicago, Ill.
119,713.—FIRE ALARM.—J. N. Pitts, J. E. Russell, Niagara, N. Y.
119,714.—WATER METER.—A. O'Leary, Iowa City, Iowa.