wark Foundry& Mach. Co., 430 Washington Ave., Phil.Pa. Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia. Pa.



HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer

Namesand addresses of correspondents will not be given to inquirers.

Werenew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editordeclines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$5, according to the subject. as we cannot be expected to spend time and labor to obtain such information without remuneration

Any numbers of the SCIENTIFIC AMERICAN SUPPLE-MENT referred to in these columns may be had at the office. Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification,

(1) C. W. G.-We do not think the application of compressed air in the manner proposed will be a success. Better apply your manual power direct to the screw or propeller.

launch 16 feet long, 40 inches beam. Boat will weigh only 150 pounds, engine and boiler 200 pounds; cylinder 2x3, 100 pounds steam, 500 revolutions. What size propeller shall I use, and how many blades, and giveproba- | is the cause of one pole being stronger than the other? ble speed of boat? A. About 18 or 20 inches diameter, A. Probably some defect in the bar or in its temper. 3 blades; speed probably 6 miles per hour.

(3) F. F. W. writes: I have a steam launch which has a boiler of about 30 inches in diameter, 41/2 when I choose, or must all lighting be under control of feet high. The gauge glass on it is 14 inches long. Now, can you tell me why the glass breaks, one nearly every day or two? It is five-eighths of an inch in diameter, and it cracks when the steam is between 40 and 90 pounds pressure. A. Perhaps on account of currents | descent lamp? A. Such a battery composed of a suffiof cold air striking the glass. Protect your glass by a screen made of sheet tin, copper, or brass.

(4) P. S. M. asks: Are not V-cone pulleys and round belts as powerful as flat belts on light machinery, and would they not be better for foot lathes? A. V-cone belts-jointed belt built upin this shapeare used to some extent in places where a large amount of power has to be transmitted, and there is not room builders use 2 inch pine plank held together with outfor a large flat belt, but these belts are not considered as efficient as fiat belts. In light machines, such as sewing machines and those of similar requirements for power, round belts are used on a pulley with channeled face, with perhaps as good or better effect than the same weight and strength of leather would give if the formula and describe the process? A. See Surfiat, but the object is rather to serve convenience in PLEMENT, No. 310. construction than gain power.

ing with forty or fifty pounds of steam will not pump bleaching soap; it may be suitable for your wants. We water against sixty or higher pressure. A. It will should think, however, that the most satisfactory way pump against 60 or 100 pounds pressure if properly proportioned.

(6) R. F. H. asks: 1. In making a dynamo half as large again as the one in SUPPLEMENT, No. 161, so that the armature and field magnets will be six inches long, what sizes silk covered wire should I use to obtain the greatest electric lighting power? A. That depends somewhat on the manner in which you intend to use the dynamo. If for an arclight-which will to wind the armature with No. 18 wire. 2. About 3 cells of Bansen battery, and then it gives only a very what candle power would such a dynamo have? weak current. A. As a large number of successful A. Probably 12 or 15. 3. How much power would machines have been made by different persons in dif-it require to drive it? A. About one-half horse ferent parts of the country from the directions given, power

(7) G. M. G. asks: Is there any kind of paper, or anything, that upon a current of electricity passing through it, it will change its color? A. Ordinary paper dipped in the following solution changes to bluecolorwhen a current of electricity passes through A. Take a length of gas pipe of from 6 to 12 inches and the paper: Nitrate of ammonia 2 pounds, muriate of of suitable diameter, screw on thimble caps, and pack ammonia 2 pounds, ferricyanide of potassium 1 ounce, water 1 gallon.

(8) J. B. D.-Hydrochloric acid will clean

The Porter-Alien High Speed Steam Engine. South- proportion of 1 to 2, or 1 to 1.5? A. They can be made of varying conductivity, but the light will vary also.

(11) W. E. V. writes: 1. A claims that a vessel sinking at sea does not sink to the bottom, owing to the density and pressure of the water underneath, but only sinks to a certain depth, while B claims that a vessel going down at sea will certainly reach the bottom of the ocean. A. There is great pressure at the bottom of the ocean, owing to the weight of the water above. Water is so slightly compressible that there is very little additional density at great depths. Everything that will sink will go to the bottom of the ocean, unless it is porous and contains air that may sustain it for a while, or until the air becomes absorbed by the water. The great pressure soon watersoaks all woody substances when carried to the bottom by being attached to denser substances. 2. Haswell gives as the estimated depth of the Atlantic, 26,000 feet; depth of the Pacific, 29,000 feet; and the depth of the course of the Atlantic cable varying from 20,000 to 18,000 feet. Is the latter depth (18,000) estimated, or taken from actual soundings? A. The cable soundings were actually made. See Scientific American Supplement, Nos. 433 and 434, for an interesting account of deep sea work. The sea is filled with animal life at great depths. Fishes live at from 3,000 to 13,000 feet below the surface, where the pressure maybe as great as a thousand to fifteen hundred pounds per square inch, and how much greater we do not know. See SCIENTIFIC AMERI-CAN SUPPLEMENT, No. 437.

(12) C. M. G. writes: I have a magnet of five-eighths square steel, horseshoe pattern; have tempered and charged it as directed in SCIENTIFIC AMERI-CAN SUPPLEMENT, No. 206, that is, I have wrapped it closely with fine insulated copper wireand placed it in the circuit of a 40 lamp power (Brush) generator, run-ning full capacity. The charge received in magnet is not sufficient to lift its own weight. What is the cause of so slight a charge, and how can I obtain a charge of magnetism in this magnet sufficient to lift ten pounds or more? A. It would be difficult topoint out the cause of your failure without knowing more of the details of the experiment. Your wire may have been so fine as (2) C. E. M. writes: I am building steam to offer too much resistance to the current. Your steel may have been either too hard or too soft, or it may have been of a kind poorly adapted to the purpose. Try chromesteel and use coarse wire for your coil. 2. What

> (13) F. A. B. asks: 1. If I buy an incandescent lamp, is there any patent to prevent my using it patentee? A. We understand that one at least of our largest electric lamp manufacturers furnishes lamps, and with them the privilege of using. 2. Why will not a plunge chemical battery furnish current for incancientnumber of elements will furnish the current; but the expense and trouble will be great.

(14) F. W. J. asks: What kind of lining ; can I put into a steam box so as to have it air tight and not cut out? Have used both zinc and galvanized iron, and both have failed. A. Wood is generally used for steam boxes, especially for steaming wood. The ship side frames and bolts.

(15) F. E. W. asks: Is there any process for depositing 8 or 10 carat gold by the electrical process for practical purposes? If so, will you please give

(16) J. F. N.-On page 937 of SCIENTIFIC (5) J. F. M. asks why a steam pump work- AMERICAN SUPPLEMENT, No. 59, is given a process for would be to bleach the resin with which your soap is prepared. Tin crystals are the stannic chloride or perchloride of tin, and are largely used in dyeing and calico printing. The preparation consists in dissolving granu lated tin in hydrochloric acid and evaporating the solution.

> (17) F. L. writes: Some time since I sent to you for SUPPLEMENT No. 161, containing instructions for making a dynamo electric machine. I made one, we conclude that the fault is yours. Try changing your commutator; try reversing the wires running to your magnets. You ought to succeed.

(18) J. E. asks: How can I caseharden small wrought iron objects, such as small set screws? of suitable diameter, screw on thimble caps, and pack The solution for platinizingis platinum chloride, and it the screws in them with bone dust, or with equal parts is put on the plates by means of electricity or electro of charcoal dust and unslaked lime; heat to a red for deposition. As to the silver plate being hard or soft, two hours, then chill in cold water. A charcoal or a it is immaterial. The composition of the alloy is of no ite will do it hituming

spectors. You can get information by addressing over the fire until the color is obtained. Mark D. Flower, St. Paul, Minn., Supervising Inspector (31) B. Y. Y. asks: Is there any of Steamboats.

(22) J. B. Z. writes: In Herper's Weekly, in giving dimensions of steamship Oregon, it says, length 520 feet, 84 feet beam; would you be kind enough to answer through your paper if 84 feet beam means the actual width of the ship, and is the Oregon that wide? This part is in dispute, left to you to settle. A. This is an error; it should be 54 feet beam, not 84 feet; 54 feet is the actual width of the vessel,

(23) H. L. C. writes: I have made a dynamo electric motor for running sewing machines; am using 3 cells, 4x6x8 carbon battery, but would prefer a single fluid battery. What is the best form of battery for the purpose-the common Smee battery or a carbon and zinc? Whatfluids are used in the carbon and zinc battery, with single fluid? A. With carbon and zinc battery use the bichromate solution, which has been repeatedly given in these columns.

(24) H. M. H. asks: 1. How can we test wall paper, cloth, etc., for arsenic, in some simple way? A. To identify the presence of arsenic in wall paper, dissolve the coloring matter off in a little ammonium hydroxide, pour off this solution on a piece of glass, and drop into the liquid a crystal of silver nitrate. A yellow coloration around the crystal indicates the preence of arsenic. This will answer as a general rule but it is only a rough test. 2. How can we test water from a well to determine if it is injurious for drinking? A. See answer to query No. 18, in Scientific AMERICAN for March 29, 1884. 3. How is the fine black polish got on carbon contacts in transmitters? Have tried on all kinds, both hard and soft, and cannot do it; they look as if varnished. A. Polish the carbons by rubbing them on sheets of very fine French emery paper. The emery paper to be placed face np on a hard bevel surface. The French carbon is best. 4. Is cast brass or gun metal as good for the frame work of transmitters as cast iron? A. Brass will do. 5. Also please give directions for making fluid for bichromate of potash batteries. A. You will find this given in several of the recent numbers of the SCIENTIFIC AMERI-CAN in the Notes and Queries columns.

(25) W. C. M. asks: Could the exhaust steam from a 35 horse power automatic cut-off engine, Hampson patent, which is only working up to 15 horse power, be used for heating to carry the exhaust 125 feet underground, and then through 13 small radiators situated on three floors? How should it be connected? What amount of back pressure would there be? A. Your exhaust steam can be utilized for all it is worth. In leading it so far underground care must be taken to box the pipe, so that it will retain as much heat as possible, putting a drip at the end. Use three inch main, and make all the branches to the various radiators so that the aggregate area or opening shall not be less than the main pipe. The drips from the radiators should also be nearly the same area as the main, and open freely. You can then heat all the radiators with very little back pressure, say half a pound to the square inch. If well proportioned, with ample outlet, you may accomplish the work with a quarter of a pound back pressure.

(26) W. F. B. asks a simple way of clean ing and roughening or recutting old mill saw files—a dip or solution of some kind. A. Old files are sometimes put to additional service by boiling instrongsoda or potash water to clear them of grease or oil; scrub all dirtand filings from the teeth with a wire brush, rinse in hot water, then dip for 10 to 20 minutes in a bath of nitric acid 1 part, water 4 parts. You must use your judgment by inspection as to the exact time, and should also in regard to the exact strength of the bath. A coarse or bastard file will stand a stronger bath than a second cut file. This process is very little used here; there are parties who recut files in the regular way.

(27) D. J. R. asks: How will it answer to put a circulating boiler for bath tub into the cellar, running the pipes to a hot water back in the room above? Will there be danger of an explosion, or will the hot water circulate downward to the boiler from the range, and the cold water rise from the boiler to the range? A. Your plan will not work. There will be no circulation. Put the boiler in the same floor with the range. and draw from the top into the bath; make the cold water connection into the bottom of the boiler, and have the pipe open to the reservoir or water supply, so as not to produce undue pressure from overheating when the hot water is not required for use. Care should also be observed in making the connections between the waterback and the boiler so as to insure circulation

(28) W. J. M.-The lacquer blisters be ause the tubes are not heated before they are lacquered. consequence. The soldering fluid is made by dissol ing as much zinc chloride as possible in a pint

neer, you must have license from United States In- Clean and polish, then draw to a light blue by holding

(31) B. Y. Y. asks: Is there any circulation of the water in a steam boiler, when steam has been nerated so the gauge shows 25 inches pressure, when all the valves are shut off and no steam escapes or is drawn off; and if there is any, will the increase of pressure increase the circulation; and if the circulation only takes place when the steam is drawn off, where will circulation be the greatest, if much or little steam is drawn off? A. There will be circulation as long as steam is generated. The more rapid the generation, the greater the circulation. If steam is drawn off more or less rapidly, the circulation will be increased. The direction of the circulating currents will depend upon the design or character of the boiler.

(32) C. W. T. asks for a liquid composition of an adhesive nature, that could be applied to any kind of paper, and when dried by hot air will make the paper hard and tough. A. Flour paste is much used by book binders for fastening sheets of paper or paper and cloth together. This may be made much stronger by the addition of a small quantity of glue. Starch is also much used for mounting where clear work is required. A little white glue added to the starch strengthens it. A little gum tragacanth in the paste or starch also strengthens, and makes clean work. The sheets should be pressed if you require flat work.

INDEX OF INVENTIONS

For which Letters Patent of the United **States were Granted** 

## May 27, 1884,

## AND EACH BEARING THAT DATE.

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

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Axles, die for forming. J. Smith Bag. See Traveling bag.	299,431
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tery,	
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Z. P. Boyer.	299,197
Card grinding roller, W. B. Guild	299,131
Carding machine, J. Shinn	<b>29</b> 9,28 <b>8</b>

off the rust scale better than sulphuric acid. Any acid
is rather troublesome to apply to the inside of a keir.
Pieces of sandstone or broken grindstone are very good
to rub off the rust with, but will not reach the corners .
and seams, or around the rivets. A file with the end
broken off, used as a scraper, will work in the corners :
and seams.

(9) A. W. B.—There is nothing that can be added to sodium silicate or water glass to prevent its dissolving when water is poured upon it. A coat of varnish over the dry coat of the silicate will naturally 30 feet long, to lay off the drsught of a boat? A. help to preserve it.

(10) J. T. B. S. writes: 1. I want some apparatus that will show the vibrations, or rather count one-quarter inch thick. the vibrations, of plates of wood or metal, so as to determine their relative pitch and qualities of vibration, and show them to the eye. Can you help me? A. Arrange a very light but rigid lever to amplify the vi-

coal is objectionable.

(19) A. B. writes: I see in your paper of May 3, a view of the Quaker dam as contemplated. As apparently the shores are rocky, would not, in tead of Leclanche cell will last six months if properly take the straight dam, a horizontally curved one, with apex against the water pressure, form a lighter, stronger,

and cheaper construction? A. No.

wheels used by dentists are made, and how, if moulded (20) H. B. R. asks: What would be the they are prevented from sticking to the mould, best material and proper dimensions to make a spline. We believe that the wheels are prepared by using the ordinary ground emery, and caking in plastic moul to such a degree of heat that the corundum solidifie Straight grained cedar or fine grained white pine, say about three-eighths inch wide and three-sixteenths to into the given shape. The mould is then broken off. (30) M. L. P. asks how to temper small

(21) F. B. asks if it is necessary to get two steel springs, such as plain springs, for gun and sma or three engineers to sign application papers when apratchet springs. A. Where gun lock springs are made plying for engineer's license. Also where and what places in Minnesota is it necessary to apply to be exin quantity, they are packed in iron boxes with pu verized charcoal and sand, heated to a full red, ar bration. Provide the lever with a needle point, and amined for license, and what are the fees for the same? dumped into a trough of oil. For a single spring th make your tracing on a cylinder carrying enameled paper A. We think there is no rule as to the number of engi-smoked to receive the impression. 2. Can carbons for neers signing the application. We do not know what soap and powdered charcoal to keep it from scaling arc lights be made of different grades of conductivity, | the State law of Minnesotais in respect to engineers. heat to a cherry red in a charcoal fire slowly, by cu so that one will last longer than the other, say in the If you wish to obtain a license as a steamboat engil ting down the blast; when evenly heated dip in lard oil.

consequence. The soluting half is made of alcosta-	Carpet fastener, J. Denton
ing as much zinc chloride as possible in a pint of	Carriage top, child's, McClinchie & Butler 299,24
alcohol, and then adding 1 ounce glycerine. Carbon	Carrier. See Cash and parcel carrier.
itself is about as hard a material as can be procured.	Cart, road, H. M. Wallis 299,441
Manganese dioxide is stable, and will not change. The	Cartridge, G. M. Peters 299,162
Leclanche cell will last six months if properly taken	Cartridges, mechanism for packing, P. Butler, 299,300
care of	Case. See Pocket case.
(90) I F S acts how the small corundum	Cash and parcel carrier, W. P. Bigelow 299,332
(20) J. E. B. asks now the small column	Caster, stove, A. J. Price 299,494
wheels used by dentists are made, and how, if moulded,	Casting slugs and leads for printers' use, mould
they are prevented from sticking to the mould. A.	for, G. W. Surguy 299,438
We believe that the wheels are prepared by using the	Ceiling, metallic, A. Northrop 299,255
ordinary ground emery, and caking in plastic moulds	Ceiling plate, R. T. Crane 299,203
to such a degree of heat that the corundum solidifies	Chain, drive; C. C. Waters 299,187
into the given shape. The mould is then broken off.	Chain, ornamental L. Heckmann 299,138
	Chain, ornamental, R. F. Simmons
(30) M. L. P. asks now to temper small	Chair backs, machine for knitting rattan, Taft &
steel springs, such as plain springs, for gun and small	Rich
ratchet springs. A. Where gun lock springs are made	Chimney cap and ventilator, W. J. Kayser 299,227
in quantity, they are packed in iron boxes with pul-	Chimney top and ventilator, J. M. Sheets 299,175
verized charcoal and sand, heated to a full red, and	Chopper. See Cotton chopper.
dumped into a trough of oil. For a single spring this	Chuck, J. G. Blount
is not necessary. Cover the spring with a little	('nuck, A. E. Ellinwood
soon and nowdered charcoal to keep it from scaling	Cnurn, J. Buri
boat to a abarra red in a abarroal fire slowly brant-	Clicie from support, F. Mutimer
the at the sheet when a charcoal life slowly, by cut	Clamp. See Floor clamp. Meat clamp.