

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 This is for our information, and not for publication.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 all price.

M in erals sent for examination should be distinctly marked or labeled.

(1) R. M. A. asks how to harden small work, such as used in watches, so that it will come out clean and white, or how to remove the black scale, provided it does not come out clean. A. Put soap on the pieces before heating. Use muriatic acid 1 part, water 2 parts, for cleaning the pieces when made black by hardening.

(2) G. Y.-For information on incubators and regulators, see SCIENTIFIC AMERICAN SUP-PLEMENT, Nos. 54, 380, 425.

being equal, what makes the strongest electro-magnet one composed of three pieces, two cores and back, or one composed of a single bar of iron bent in "horseshoe" form? A. The single piece of iron would be rather the stronger. 2. How must I wrapthis magnetwith wire in sections, or in one winding? A. Sectional winding may be useful as a matter of convenience. We should not recommend it as increasing the power. 3. In the Holtz machine described in SUPPLEMENT, No. 278, are both inductors applied to their respective windows on the same face of the eye glass, or is an inductor first applied, and then the plate of glass turned over so as to lie on its opposite face, and the other inductor then applied? When both plates are in position on the machine, are the inductors-if both are on the same face of the glass-on the face farthest away from the revolving plate, or on the side nearest to it? A. The inductors in the Holtz machine are on the same side of the glass plate-the side furthest from the revolving plate. 4. Will a magneto machine run an induction coil? If so, must a current interrupter be used? A. A magneto machine will run an induction coil without an interrupter.

(4) Wm. asks: Was there ever a time in the last 100 years when a double eagle meant \$100? A. No, but the double eagle of 1849 sells to-day for \$300, on account of its rarity.

(5) F. K. desires a receipt to make beef wine, and iron, as made and sold by the apothecaries. A. Liebig's extract of beef 1/2 ounce av., ammonio citrate of iron 256 grains, spirit of orange 1/2 fl. oz., distilled water $1\frac{1}{2}$ fl. oz., sherry wine sufficient to make 16 fl. oz. Dissolve the ammonio citrate of iron in the water, dissolve the extract of beef in the sherry wine, add the spirit of orange, and mix the solutions.

(6) W. C. asks: What is the difference between a dynamo-electric machine and a magneto-elec tric machine? A. The dynamo has its magnetic field established by an electro magnet; the magneto, by a permanent magnet

(7) C. B. N. asks about the "Legion of Honor" of France. A. It is an order founded by Napoleon, May 19, 1802, as an especially honorary recompense for services rendered to the state. The decoration consists of a five rayed star, bearing the imperial effigy and eagle and surmounted by the imperial crown

(8) W. H. R. asks: 1. What is the speed of Ericsson's Destroyer? A. We believe the trials thus far have not settled this question. 2. Which is considered the best-the Armstrong, Krupp, De Bange, or Whitworth system of artillery? A. Each the best process of intensifying a negative, and how of these systems has its peculiar advantages. We do not yet know which is to take the lead. 3. What is the rule for calculating the range of a gun, when the velocity and weight of the projectile are known? A. The pro blems pertaining to projectiles are rather complex, but fully given, with examples, in "A Treatise on Practical Mathematics," Chambers' Educational Course, \$1.50, which we can furnish. The formulas are:

h = Height due to velocity of projection. v = Velocity of projection in feet per second. r=The range required. e = Angle of elevation. g=Gravity=32.2. Then

(9) H. K. B. asks: What size and length of wire would be best to use in constructing the Deprez galvanometer (described in your issue of December 4). If a single magnet of good strength, and 7 inches high, ¾ inch thick, 1 inch between the poles, and each pole piece or arm of the magnet is 11 inch in width be used, could it be made to work well with such a magnet? The galvanometer is to be used in circuits of medium resistance, and to test the relative strength of different battery cells. Is it absolutely necessary to use silver wire to suspend the coil by, and will the deflections be directly proportional to the current strength? Also what is the soft iron cylinder for, and must theiron be very soft? A. The best way is not to depart from the dimensions given, which represent the results of good practice. Your magnet would probably answer. Adhere to the sizes of wire given for the coil. You can only use it on extremely weak currents or as a volt meter. Any attempt to use it directly as an ammeter will destroy it unless the current is very slight. Silver wire is far the best for suspending it. The soft iron cylinder becomes polar ized and increases the intensity of the field. It should be good quality wrought iron. The deflections will only be proportional to the current strength when used by the discharge method, and it is not very reliable for this work.

(10) B. F. S. asks: What is the best, but simplest, method of tempering mill picks? Please give us two or three ways of doing same. The smiths here do not have success, and we want a method of doing it ourselves. A. The tempering of mill picks is more a matter of care and observation than any special material used in the process. More picks are spoiled (3) H. H. asks: 1. All other things by burning or overheating the corners than by any other part of their manufacture. A slow fire and heat ing back from the point is an essential feature. Do not draw the edge thin. Leave it a little blunt and grind for the proper edge. Heat to a cherry red, no more at the corners than in the middle. Dip in clear water, and draw the temper to a full straw color. Brighten the edge surface on a grindstone or with emery paper before tempering. See valuable articles on Harden ing and Tempering Tools, by J. Rose, in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 95, 103, 105.

> (11) C. S. S.-Wood steeped in a solution of copperas becomes harder and more indestructible

(12) J. F. D. desires (1) a receipt for cheap paint for old shingle roofs. A. Coaltar paint would be the cheapest thing you can use. See a "Re-cipe for Roofing Paint," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 113. 2. What chemical will make water and coal tar mix? A. You cannot make a perfect mixture of them.

(13) W. L. J. asks best material to put n ropes used in water (fresh), such as boom ropes Also on ropes used in hauling logs out of boom. A. Immersing the cordage in a solution of 50 or 60 parts water and 1 part corrosive sublimate will tend to preserve the rope. As to use of tar, the best rope is not tarred.

(14) T. J. C. asks: What material is used for a matrix in casting celluloid stereotypes? A. Celluloid should not be cast, but becomes sufficiently soft at 165° Fah. to assume desired forms by press ing, which should be done in a brass mould, also heated beforehand, the article to be cooled off in the mould by cold water. When articles can be punched or pressed from the material, it should be heated in warm vater to 100° Fah., to prevent tearing and splintering.

(15) D. P. B.-A mixture of coal tar and plumbago, thinned with turpentine or benzine, makes the best paint for an iron smokestack.

(16) P. M. asks for a paste not liable to be affected by liquids, vinegar, etc., for fastening a small glass disk in a metal cap. A. Boil 3 parts resin with 1 part of caustic soda and 5 parts of water, thus making a kind of soap which is mixed with half its weight of plaster of Paris.

(17) A. J. K. asks (1) a transparent ruby and a yellow colored varnish to cover glass with for photographic purposes. A. Use aniline colors mixed with collodion. 2. How to make a good negative varnish? A. Sandarac 4 ounces, alcohol 28 ounces, oil of lavender 3 ounces, chloroform 5 drachms. 3. What is done? A. Bichloride of mercury, saturated solution, in cold water. The negative should be placed in alum a short time before treatment. Wash negative well, and immediately pour on mercury solution: do not keep it on too long unless the negative is very thin. Wash well and immerse in a bath of water 10 ounces and ammonia 10 drops. Leave plate in this solution until the black color goes quite through the film. Wash well. If the mercury solution makes the negative too dense dilute with water.

(18) E. R. S. writes : I have a "weeping sinew" between my first and second knuckles on my right hand. What will cure it? A. Paint it with io

(22) M. B. L. asks: What kind of ink or crayon will resist acid on copper or zinc? A. Use a black asphaltum varnish, procurable at any first class paint store.

(23) H. O. T. asks for the best mode of finding or tracing trichinæ in pork by means of a microscope. A. Cut a very thin longitudinal slice of the muscle by means of a very sharp knife or razor. Press it between two glass slips, and examine by transmitted light. The coiled trichinæ may be readily distinguished from the muscle fiber.

(24) S. S. asks whether frictional electricity can be generated on a damp, rainy day. If so, in what proportion to a dry, clear day? A. Practically speaking it cannot, as moisture in the air conducts it away; in many cotton factories, arrangements are made by spraying to impart some moisture to the air, in order to dissipate the electricity generated by the motion of the machinery.

(25) T. L. R. asks about the relative buoyancy of deep and shallow water, stating that a vessel drawing 12 feet will touch the bottom in passing over a shoal that is more than 12 feet in depth. A. There is no difference in the buoyancy of the water, but the swell caused by the vessel's motion has its corresponding depression, to which the vessel must set tle, and this swell is greater in shallow than in deep water.

(26) Curiosity asks: 1. Will the government's new cruisers, in course of completion, be illus trated in your paper? A. We have illustrated some -see SUPPLEMENT, No. 555-and shall continue as hitherto to do so. 2. Has the government enough heavy armament, viz., 54 ton guns, to equip all of the new vessels? A. No; many new guns have yet to be built. 3. Suppose an enemy's vessel carrying 100 ton guns should fire a shell at long range, and explode same within a very few feet of the vessel which is to carry the pneumatic guns and 12,000 pounds nitroglycerine, would there be any danger of the concus sion exploding the nitro-glycerine? A. The concussion from an exploding shell would not be enough to explode explosive gelatine. Lieut, Zalinski has made exhaustive experiments on this point, and has proved its absolute safety from explosion by aerial concussion of gunpowder, fulminate, or other explosive. 4. Please give relative strength of France and Germany, both on sea and land, at present time.

А.	France.		
	Агшу	497,458	men
	Gendarmes	25,285	6 4
	Navy	410	ships
		42,789	men
	Germany.		
	Army		
	Armorers, etc	3,918	48
	Navy	98	ships
	Besides torpedo boats built		
	and building, which are to		
	a mount to	150	vessels
	•	17,426	men

TO INVENTORS.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted,

April 26, 1887,

AND EACH BEARING THAT DATE.

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

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Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditching machine, J. W. & M. F. Brinkley Diving apparatus, J. Bruce Dope cup, A. T. Ballantine Dope cup, R. M. Phelan Door check, F. D. Guild Door check, Shaw & Wixon Door lock, sliding, E. B. Searles Door lock, sliding, E. B. Searles Door spring, E. D. Beales Drier. See Fruit drier. Drill. See Fock drill. Dys vat, I. H. & T. Bottomley Dynamometer, recording, C. M. Giddings Earring, A. Luthy Electric apparatus, binding device for, I. W Litchfield Electric covering for indicating abnormai con- ditions, G. J. Jewill	361,206 361,768 361,778 361,670 361,925 361,91 361,810 361,810 361,840 361,840 361,847 361,921 361,921 361,705 361,705
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditching machine, J. W. & M. F. Brinkley Diving apparatus, J. Bruce Dope cup, A. T. Ballantine Dope cup, R. M. Phelan Door check, F. D. Guild Door check, F. D. Guild Door check, Shaw & Wixon Door lock, sliding, E. B. Searles Door spring, E. D. Beales Drill. See Rock drill. Dust collector, A. C. Nagel et al Dye vat, I. H. & T. Bottomley Dynamometer, recording, C. M. Giddings Earring, A. Luthy Electric apparatus, binding device for, I. W Litchfield Electric covering for indicating abnormai con- ditions, G. J. Jewill. Electric inductive translator, W. Main Electric machine regulator, dynamo, C. G. Per kins	361,206 361,768 361,779 361,670 361,670 361,916 361,891 361,891 361,633 361,840 361,840 361,840 361,840 361,847 361,921 361,659 361,775 362,010 361,772
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditching machine, J. W. & M. F. Brinkley Diving apparatus, J. Bruce Dope cup, A. T. Ballantine Dope cup, R. M. Phelan Door check, F. D. Guild Door check, Shaw & Wixon Door lock, sliding, E. B. Searles Door lock, sliding, E. B. Searles Door spring, E. D. Beales Drier. See Fruit drier. Drill. See Fock drill. Dys vat, I. H. & T. Bottomley Dynamometer, recording, C. M. Giddings Earring, A. Luthy Electric apparatus, binding device for, I. W Litchfield Electric covering for indicating abnormai con- ditions, G. J. Jewill	361,806 361,768 361,779 361,670 361,925 361,925 361,925 361,925 361,925 361,925 361,921 361,830 361,840 361,840 361,840 361,711 361,921 361,765 361,770 361,770
 Dental engine brush, L. W. Ballard	361,206 361,768 361,779 361,670 361,671 361,670 361,915 361,916 361,891 361,633 361,840 361,840 361,840 361,840 361,840 361,921 361,921 361,759 361,759 361,770 361,770
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditching machine, J. W. & M. F. Brinkley Diving apparatus, J. Bruce Dope cup, A. T. Ballantine Dope cup, R. M. Phelan Door check, F. D. Guild Door check, Shaw & Wixon Door lock, sliding, E. B. Searles Door sheck, S. D. Beales Dori ock, sliding, E. B. Searles Dorier. See Fruit drier. Drift. See Kock drill. Dust collector, A. C. Nagel et al Dyramometer, recording, C. M. Giddings Earring, A. Luthy. Electric apparatus, binding device for, I. W Litchfield Electric inductive translator, W. Main Electric machine regulator, dynamo, C. G. Per kins Electric machines, armature core for dynamo, A Schmid.	361,806 361,768 361,779 361,671 361,670 361,925 361,916 361,891 361,891 361,810 361,810 361,840 361,840 361,840 361,761 361,770 361,770 361,712 361,896 361,896
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens. Distilling apparatus, Brown & Neeley. Ditching machine, J. W. & M. F. Brinkley. Diving apparatus, J. Bruce. Dope cup, A. T. Ballantine. Door check, F. D. Guild. Door check, Shaw & Wixon. Door olock, sliding, E. B. Searles. Dorier. See Fruit drier. Drift. See Rock drill. Dust collector, A. C. Nagel <i>et al.</i> Dy vat, I. H. & T. Bottomley. Dynamometer, recording, C. M. Giddings Earring, A. Luthy. Electric apparatus, binding device for, I. W Litchfield. Electric covering for indicating abnormai con- ditions, G. J. Jewill. Electric machine regulator, dynamo, C. G. Per kins Electric machines, armature core for dynamo, A Schmid Electrica conductor, L. Daft.	361,806 361,768 361,779 361,670 361,925 361,925 361,925 361,925 361,925 361,925 361,921 361,840 361,840 361,840 361,840 361,711 361,921 361,755 362,010 363,775 361,775 361,775 361,775
 Dental engine brush, L. W. Ballard	361,206 361,768 361,779 361,670 361,670 361,916 361,891 361,891 361,633 361,840 361,840 361,840 361,840 361,840 361,921 361,921 361,921 361,759 361,775 361,775 361,775
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditching machine, J. W. & M. F. Brinkley Diving apparatus, J. Bruce Dope cup, A. T. Ballantine Dope cup, R. M. Phelan Door check, F. D. Guild Door check, Shaw & Wixon Door check, Shaw & Wixon Door ock, sliding, E. B. Searles Door spring, E. D. Beales Drier. See Fruit drier. Drill. See Rock drill. Dust collector, A. C. Nagel et al Dyramometer, recording, C. M. Giddings Earring, A. Luthy. Electric apparatus, binding device for, I. W Litchfield. Electric covering for indicating abnormai con- ditions, G. J. Jewill Electric machine regulator, dynamo, C. G. Per kins Electric machines, armature core for dynamo, A Schmid. Electrical conductor, L. Daft. Electrical power, apparatus for distributing, E A. Sperry	361,206 361,768 361,779 361,671 361,670 361,925 361,916 361,891 361,891 361,810 361,840 361,840 361,840 361,847 361,921 361,921 361,759 361,765 362,010 361,770 361,712 361,896 361,896
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens. Distilling apparatus, Brown & Neeley. Ditching machine, J. W. & M. F. Brinkley. Diving apparatus, J. Bruce. Dope cup, A. T. Ballantine. Dope cup, A. T. Ballantine. Dope cup, R. M. Phelan. Door check, F. D. Guild. Door check, Shaw & Wixon. Door spring, E. D. Geales. Difer. See Fruit drier. Drill. See Rock drill. Dust collector, A. C. Nagel et al. Dy e vat, I. H. & T. Bottomley. Dynamometer, recording, C. M. Giddings Earring, A. Luthy. Electric apparatus, binding device for, I. W Litchfield. Electric covering for indicating abnormal con- ditions, G. J. Jewill. Electric machines, armature core for dynamo, A Schmid. Electric machines, commutator for dynamo, A Schmid. Electrical conductor, L. Daft. Electrical power, apparatus for distributing, E A. Sperry	361,806 361,768 361,778 361,779 361,971 361,925 361,925 361,925 361,925 361,932 361,830 361,840 361,840 361,840 361,847 361,921 361,921 361,659 361,775 361,775 361,770 361,712 361,772 361,772
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditching machine, J. W. & M. F. Brinkley Diving apparatus, J. Bruce Dope cup, A. T. Ballantine Dope cup, R. M. Phelan Door check, F. D. Guild Door check, Shaw & Wixon Door check, Shaw & Wixon Door ock, sliding, E. B. Searles Door spring, E. D. Beales Drier. See Fruit drier. Drill. See Rock drill. Dust collector, A. C. Nagel et al Dyramometer, recording, C. M. Giddings Earring, A. Luthy. Electric apparatus, binding device for, I. W Litchfield. Electric covering for indicating abnormai con- ditions, G. J. Jewill Electric machine regulator, dynamo, C. G. Per kins Electric machines, armature core for dynamo, A Schmid. Electrical conductor, L. Daft. Electrical power, apparatus for distributing, E A. Sperry	361,206 361,768 361,778 361,778 361,778 361,778 361,971 361,925 361,915 361,810 361,810 361,840 361,840 361,840 361,770 361,770 361,770 361,770 361,770 361,770 361,773 361,973 361,973
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Diting apparatus, J. Bruce. Dope cup, A. T. Ballantine. Dope cup, A. T. Ballantine. Dope cup, R. M. Phelan. Door check, F. D. Guild. Door check, Shaw & Wixon. Door spring, E. D. Beales. Drier. See Fruit drier. Drill. See Rock drill. Dust collector, A. C. Nagel et al. Dy e vat, I. H. & T. Bottomley. Dynamometer, recording, C. M. Giddings Earring, A. Luthy. Electric apparatus, binding device for, I. W Litchfield. Electric covering for indicating abnormal con- ditions, G. J. Jewill. Electric machines, armature core for dynamo, A Schmid. Electrical conductor, L. Daft. Electrical conductor, L. Daft. Electrical power, apparatus for distributing, E A. Sperry. Elevators, electric valve operating mechanism for, G. H. Reynolds	361,206 361,768 361,778 361,779 361,670 361,925 361,925 361,925 361,925 361,921 361,840 361,840 361,840 361,840 361,711 361,921 361,705 361,705 361,705 361,770 361,712 361,712 361,846 361,848 361,848
 Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes. machine for washing, J. S. Stevens. Distilling apparatus, Brown & Neeley. Ditching machine, J. W. & M. F. Brinkley. Diving apparatus, J. Bruce. Dope cup, A. T. Ballantine. Door check, F. D. Guild. Door check, Shaw & Wixon. Electric apparatus, binding device for. I. W Litchfield. Electric machine regulator, dynamo, C. G. Per kins. Electric machines, armature core for dynamo, A Schmid. Schemid. Elevators, electric valve operating mechanism for, G. H. Reynolds. Elevators, means for electrically controlling th operation of, G. H. Reynolds. Embroidering machine, E. Cornely. 	361,806 361,768 361,778 361,778 361,778 361,778 361,971 361,925 361,925 361,925 361,921 361,840 361,840 361,840 361,711 361,921 361,921 361,750 361,775 361,775 361,773 361,773 361,7780 831,7780 831,7780
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens. Distilling apparatus, Brown & Neeley. Ditching machine, J. W. & M. F. Brinkley. Diving apparatus, J. Bruce. Dope cup, A. T. Ballantine. Dope cup, A. T. Ballantine. Door check, F. D. Guild. Door check, S. D. Guild. Door check, Shaw & Wiron. Door lock, Sliding, E. B. Searles. Door spring, E. D. Beales. Dorier. See Fruit drier. Drift. See Fout drier. Ditl. See Rock drill. Dust collector, A. C. Nagel et al. Dye vat, I. H. & T. Bottomley. Dynamometer, recording, C. M. Giddings. Ekarring, A. Lutby. Electric apparatus, binding device for, I. W Litchfield. Electric machine regulator, dynamo, C. G. Per kins. Electric machines, armature core for dynamo, A Schmid. Electric machines, commutator for dynamo, A Schmid. Electrical power, apparatus for distributing, E A. Sperry. Electrical power, apparatus for distributing, E A. Sperry. Elevators, electric valve operating mechanism for, G. H. Reynolds. Electrical power, heavende. Electrical power, apparatus for distributing, E A. Sperry. Elevators, means for electrically controlling th operation of, G. H. Reynolds. Embroidering machine, E. Cornely. End gate, C. F. Bassett.	361,206 361,768 361,778 361,778 361,778 361,771 361,670 361,891 361,891 361,891 361,893 361,840 361,897 361,781 361,759 361,775 361,775 361,775 361,770 361,772 361,778 361,778 361,779 361,779 361,779 361,779 361,779
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditching machine, J. W. & M. F. Brinkley Diving apparatus, J. Bruce Dope cup, A. T. Ballantine Dope cup, R. M. Phelan Door check, F. D. Guild Door check, Shaw & Wixon Door olock, sliding, E. B. Searles Doro spring, E. D. Beales Drier. See Fruit drier. Drill. See Rock drill. Dust collector, A. C. Nagel et al Dy evat, I. H. & T. Bottomley Dynamometer, recording, C. M. Giddings Earring, A. Luthy. Electric apparatus, binding device for, I. W Litchfield Electric machine regulator, dynamo, C. G. Per kins Electric machines, armature core for dynamo, A Schmid Electrical power, apparatus for distributing, E P. Warner Electrical power, apparatus for distributing, E A. Spery Elevators, electric valve operating mechanism for, G. H. Reynolds	361,206 361,768 361,779 361,670 361,925 361,915 361,916 361,891 361,891 361,810 361,840 361,840 361,840 361,840 361,711 361,921 361,659 361,765 361,775 361,770 361,712 361,712 361,826 361,779 361,779 361,779 361,779 361,779 361,779 361,779 361,779 361,779
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens. Distilling apparatus, Brown & Neeley. Ditching machine, J. W. & M. F. Brinkley. Diving apparatus, J. Bruce. Dope cup, A. T. Ballantine. Door check, F. D. Guild. Door check, Shaw & Wixon. Door olock, sliding, E. B. Searles. Dorier. See Fruit drier. Drill. See Rock drill. Dust collector, A. C. Nagel <i>et al.</i> Dy rat, I. H. & T. Bottomley. Dynamometer, recording, C. M. Giddings Earring, A. Luthy. Electric apparatus, binding device for, I. W Litchfield. Electric covering for indicating abnormal con- ditions, G. J. Jewill. Electric machines, armature core for dynamo, A Schmid. Electric machines, armature core for dynamo, A Schmid. Electric apparatus for distributing, E A. Sperry. Elevators, electric valve operating mechanian for, G. H. Reynolds. Sembroidering machine, E. Cornely. End gate, F. B. Cunningham. End gate, F. B. Cunningham.	361,806 361,768 361,778 361,778 361,778 361,778 361,771 361,975 361,975 361,840 361,840 361,840 361,840 361,840 361,840 361,711 361,921 361,755 362,010 361,775 361,775 361,779
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditching machine, J. W. & M. F. Brinkley Diving apparatus, J. Bruce Dope cup, A. T. Ballantine Dope cup, R. M. Phelan Door check, F. D. Guild Door check, Shaw & Wixon Door olock, sliding, E. B. Searles Doro spring, E. D. Beales Drier. See Fruit drier. Drill. See Rock drill. Dust collector, A. C. Nagel et al Dy evat, I. H. & T. Bottomley Dynamometer, recording, C. M. Giddings Earring, A. Luthy. Electric apparatus, binding device for, I. W Litchfield Electric machine regulator, dynamo, C. G. Per kins Electric machines, armature core for dynamo, A Schmid Electrical power, apparatus for distributing, E P. Warner Electrical power, apparatus for distributing, E A. Spery Elevators, electric valve operating mechanism for, G. H. Reynolds	361,806 361,768 361,778 361,778 361,778 361,778 361,771 361,975 361,975 361,840 361,840 361,840 361,840 361,840 361,840 361,711 361,921 361,755 362,010 361,775 361,775 361,779
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditting apparatus, J. Bruce. Dope cup, A. T. Ballantine. Dope cup, A. T. Ballantine. Dope cup, R. M. Phelan. Door check, F. D. Guild. Door check, Shaw & Wixon. Door check, Shaw & Wixon. Shaw & Child, C. Magle et al. Schmid. Electric machines, armature core for dynamo, A Schmid. Electrical conductor, L. Daft. Electrical conductor, L. Daft. Electrical power, apparatus for distributing, E A. Sperry Elevators, electric valve operating mechanism for, G. H. Reynolds. Embroidering machine, E. Cornely. End gate, F. B. Cunningham. End gate, F. B. Cunningham. End gate, F. B. Cunningham. End gate, F. B. Cunningham. End gate, Wagon, M. S. Tyler. Engine. See Carding engine. Gas marine en gine. Escapement wheel, Heath & Champlin.	361,806 361,768 361,778 361,778 361,778 361,778 361,778 361,772 361,975 361,840 361,840 361,840 361,840 361,840 361,840 361,840 361,711 361,921 361,775 361,775 361,775 361,775 361,770 361,712 361,854 361,848 361,848 361,848 361,845 361,877 361,874 361,845 361,845 361,971 361,845 361,971 361,845 361,971 361,845 361,971 361,973 361,971 361,971 361,973 361,973 361,971 361,971 361,973 361,971 361,971 361,973 361,971 361,971 361,971 361,973 361,971 371 371,971 371,971 371,971 371,971 371,971 371,971 371,971 371,971
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal Dishes, machine for washing, J. S. Stevens. Distilling apparatus, Brown & Neeley. Ditching machine, J. W. & M. F. Brinkley. Diving apparatus, J. Bruce. Dope cup, A. T. Ballantine. Dope cup, R. M. Phelan. Door check, F. D. Guild. Door check, Shaw & Wixon. Door spring, E. D. Beales. Drier. See Fruit drier. Drill. See Rock drill. Dust collector, A. C. Nagel et al. Dy e vat, I. H. & T. Bottomley. Dynamometer, recording, C. M. Giddings Exarring, A. Luthy. Electric apparatus, binding device for. I. W Litchfield. Electric covering for indicating abnormal con- ditions, G. J. Jewill. Electric machine regulator, dynamo, C. G. Per kins Electric machines, armature core for dynamo, A Schmid. Schmid. Electric achines, commutator for dynamo, E P. Warner. Electrical power, apparatus for distributing, E A. Sperry. Elevators, electric valve operating mechanism for, G. H. Reynolds. Embroidering machine, E. Cornely. End gate, C. F. Bassett. End gate, F. B. Cunningham. End gate, Waeon, M. S. Tyler. End gate, Waeon, M. S. Tyler. End gate, wagon, M. S. Tyler. Exappenent wheel, Heath & Champlin. Ether, production of a new ethyl, R. Gnehm	361,906 361,768 361,778 361,778 361,778 361,779 361,916 361,891 361,891 361,891 361,893 361,840 361,840 361,840 361,840 361,840 361,847 361,921 361,921 361,779 361,770
 Dental engine brush, L. W. Ballard	361,206 361,768 361,778 361,778 361,778 361,778 361,771 361,971 361,891 361,891 361,891 361,891 361,891 361,897 361,705 361,705 361,705 361,705 361,705 361,705 361,707 361,712 361,896 361,779 361,896 361,779 361,779 361,779 361,747 361,747 361,945 361,945 361,856
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditting apparatus, J. Bruce. Dope cup, A. T. Ballantine. Dope cup, A. T. Ballantine. Dope cup, R. M. Phelan. Door check, F. D. Guild. Door check, Shaw & Wixon. Door spring, E. D. Beales. Drier. See Fruit drier. Drill. See Rock drill. Dust collector, A. C. Nagel et al. Dy e vat, I. H. & T. Bottomley. Dynamometer, recording, C. M. Giddings Earring, A. Luthy. Electric apparatus, binding device for, I. W Litchfield. Electric covering for indicating abnormal con- ditions, G. J. Jewill. Electric machine regulator, dynamo, C. G. Per kins Electric machines, armature core for dynamo, A Schmid. Electrical conductor, L. Daft. Electrical power, apparatus for distributing, E A. Sperry. Elevators, electric valve operating mechanism for, G. H. Reynolds	361,806 361,768 361,778 361,778 361,778 361,778 361,778 361,770 361,925 361,925 361,891 361,891 361,891 361,840 361,840 361,840 361,840 361,711 361,921 361,779 361,770 361,770 361,770 361,772 361,848 361,848 361,848 361,845 361
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditting machine, J. W. & M. F. Brinkley Diving apparatus, J. Bruce Dope cup, A. T. Ballantine Dope cup, R. M. Phelan Door check, F. D. Guild Door check, Shaw & Wiron Door check, Shaw & Wiron Door check, Shaw & Wiron Door check, Siding, E. B. Searles Door spring, E. D. Beales Drier. See Fruit drier. Drill. See Rock drill. Dust collector, A. C. Nagel et al Dy e vat, I. H. & T. Bottomley Dynamometer, recording, C. M. Giddings Ekarring, A. Luthy Electric apparatus, binding device for, I. W Litchfield Electric covering for indicating abnormal con- ditions, G. J. Jewill. Electric machine regulator, dynamo, C. G. Per kins Electrical conductor, L. Daft Electrical power, apparatus for distributing, E A. Sperry Electrical power, apparatus for distributing, E A. Sperry Electrical power, apparatus for distributing, E A. Sperry Electrical power, apparatus for distributing, E A. Sperry Elevators, electric valve operating mechanism for, G. H. Reynolds	361,906 361,768 361,778 361,778 361,778 361,778 361,771 361,971 361,915 361,831 361,833 361,840 361,840 361,847 361,847 361,847 361,921 361,921 361,659 362,010 361,779 361,770 361,770 361,772 361,848 361,779 361,779 361,779 361,779 361,848 361,779 361,876 361,779 361,877 361,878 361,879 361,879 361,878 361,779 361,878 361,779 361,878 361,879
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditting machine, J. W. & M. F. Brinkley Diving apparatus, J. Bruce Dope cup, A. T. Ballantine Dope cup, R. M. Phelan Door check, F. D. Guild Door check, Shaw & Wixon Door check, Shaw & Wixon Door lock, sliding, E. B. Searles Dor sping, E. D. Beales Dorier. See Fruit drier. Drill. See Rock drill. Dust collector, A. C. Nagel et al Dy e vat, I. H. & T. Bottomley Dynamometer, recording, C. M. Giddings Earring, A. Luthy. Electric apparatus, binding device for, I. W Litchfield. Electric covering for indicating abnormai con- ditions, G. J. Jewill Electric machine regulator, dynamo, C. G. Per kins Electric ablines, armature core for dynamo, A Schmid Electrical conductor, L. Daft Electrical power, apparatus for distributing, E A. Sperry Electrical power, apparatus for distributing, E A. Sperry Elevators, lectric valve operating mechanism for, G. H. Reynolds	361,206 361,768 361,778 361,778 361,778 361,778 361,771 361,970 361,891 361,891 361,891 361,840 361,840 361,847 361,769 361,770 371,770 371,77
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditting apparatus, J. Bruce. Dope cup, A. M. F. Brinkley Dope cup, A. T. Ballantine. Dope cup, R. M. Phelan Door check, F. D. Guild. Door check, S. D. Guild. Door check, S. D. Guild. Door check, Siding, E. B. Searles. Door spring, E. D. Beales. Drier. See Fruit drier. Drill. See Rock drill. Dust collector, A. C. Nagel et al. Dy e vat, I. H. & T. Bottomley. Dynamometer, recording, C. M. Giddings Exarring, A. Luthy. Electric apparatus, binding device for, I. W Litchfield. Electric covering for indicating abnormal con- ditions, G. J. Jewill. Electric machine regulator, dynamo, C. G. Per kins Electrical conductor, L. Daft Electrical power, apparatus for distributing, E A. Sperry. Electrical power, apparatus for distributing, E A. Sperry. Elevators, electric valve operating mechanism for, G. H. Reynolds. Embroidering machine, E. Cornely. End gate, C. F. Bassett. End gate, C. F. Basset	361,906 361,768 361,778 361,778 361,778 361,778 361,771 361,916 361,916 361,891 361,891 361,891 361,891 361,891 361,892 361,705 361,705 361,705 361,705 361,705 361,705 361,705 361,705 361,705 361,705 361,705 361,705 361,705 361,705 361,705 361,705 361,705 361,896 361,779 361,973 361,848 361,779 361,779 361,848 361,779 361,848 361,779 361,971 361,971 361,972 361,973 361,973 361,975 361,854 361,779 361,975 361,975 361,779 361,975 361,779 361,975 361,779
 Dental engine brush, L. W. Ballard	361,906 361,768 361,778 361,778 361,778 361,778 361,778 361,771 361,971 361,971 361,891 361,891 361,891 361,891 361,891 361,891 361,891 361,891 361,921 361,779 361,775 361,775 361,775 361,775 361,770 361,870 361,870 361,870 361,890 361,80
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditving apparatus, J. Bruce Dope cup, A. T. Ballantine Dope cup, A. T. Ballantine Door check, F. D. Guild Door check, Shaw & Wixon Door olock, sliding, E. B. Searles Dor spring, E. D. Beales Dorier. See Fruit drier. Drill. See Rock drill. Dust collector, A. C. Nagel et al Dy e rat, I. H. & T. Bottomley Dynamometer, recording, C. M. Giddings Earring, A. Luthy. Electric apparatus, binding device for, I. W Litchfield. Electric covering for indicating abnormai con- ditions, G. J. Jewill Electric machine regulator, dynamo, C. G. Per kins Electric machines, armature core for dynamo, A Schmid Electrical conductor, L. Daft Electrical conductor, L. Daft Electrical power, apparatus for distributing, E A. Sperry Elevators, electric valve operating mechanism for, G. H. Reynolds	361,906 361,768 361,778 361,778 361,778 361,778 361,971 361,970 361,915 361,891 361,891 361,840 361,840 361,840 361,847 361,921 361,921 361,921 361,779 361,779 361,770 361,770 361,772 361,772 361,779 370,779 370,779 370,770 370,770 370,77
 Dental engine brush, L. W. Ballard	361,906 361,768 361,778 361,778 361,778 361,778 361,771 361,971 361,971 361,891 361,891 361,833 361,840 361,840 361,840 361,921 361,921 361,921 361,921 361,779 361,779 361,770 361,770 361,770 361,770 361,770 361,770 361,770 361,770 361,770 361,770 361,770 361,770 361,973 361,770 361,779 361,770 361,845 361,779 361,779 361,779 361,770 361,845 361,779 361,779 361,770 361,875 361,87
Dental engine brush, L. W. Ballard Dental plugger, W. Loewenthal. Dishes, machine for washing, J. S. Stevens Distilling apparatus, Brown & Neeley Ditting apparatus, J. Bruce Dope cup, A. T. Ballantine Dope cup, R. M. Phelan Door check, F. D. Guild Door check, Shaw & Wixon Door string, E. D. Beales Drier. See Fruit drier. Drill. See Rock drill. Dust collector, A. C. Nagel et al Dye vat, I. H. & T. Bottomley Dynamometer, recording, C. M. Giddings Earring, A. Luthy Electric apparatus, binding device for, I. W Litchfield Electric ductive translator, W. Main Electric machines, armature core for dynamo, A Schmid Electric machines, armature core for dynamo, A Schmid Electrical power, apparatus for distributing, E A. Sperry Elevators, electric valve operating mechanism for, G. H. Reynolds Elevators, means for electrically controlling th operation of, G. H. Reynolds Embroidering machine, E. Cornely End gate, C. F. Bassett End gate, C. F. Bassett End gate, Waeon, M. S. Tyler End gate, See Carding engine. Gas marine en gine. Excapament wheel, Heath & Champlin Extension table, C. Gebhardt Ergeines or spectacle case, F. Shailer Fare bores, lighting device for, Brownrigg & Sutzin Fiber cicaning machine, A. W. Savage File case, F. R. Alderman File holder, T. E. Baden	361,906 361,768 361,778 361,778 361,778 361,778 361,771 361,670 361,891 361,891 361,891 361,893 361,843 361,843 361,685 361,779 361,770 361,77
 Dental engine brush, L. W. Ballard	361,906 361,768 361,779 361,771 361,670 361,915 361,915 361,915 361,831 361,831 361,830 361,840 361,840 361,840 361,840 361,840 361,921 361,921 361,921 361,759 361,759 361,770 361,770 361,973 361,973 361,973 361,973 361,973 361,973 361,973 361,973 361,973 361,973 361,973 361,973 361,973 361,973 361,973 361,973 361,974 361,979 361,974 361,972 361,975 375,975 375,97

=- r =2h	sin,	2e
2g		

For example: A ball discharged at a velocity of 1,500 feet per second, at an elevation of 24° 36', required the fange.

1,5002 -- 34,938 -- h, and 2×32[.]2

69,876×0.756995=52,896 feet, or 10 miles. Use the table of natural sines. 4. Have mortars been improved as much in the last twenty years as cannon? A. Mortars are out of date, both shells and solid projectiles being fired from the great guns now made. 5. What is the name of the most powerful war ship at present afloat? A. There is considerable doubt as to which of some three or four of the European war ships would be the most powerful in actual battle, which would give the only practical test. 6. I have a microscope of the Student class. The body and draw tube are not blackened inside. Should this be done? The definition of this microscope is good in the day time, but bad by lamp light. What is the cause? A. The microscope should be black inside. Probably you do not understand the management of the light. We can send you a book, "How to Use the Microscope," by J. Phin, 75 cents.

(19) Stencil Cutter, Ironton, O., asks: B What is the best mixture to stencil name on stoneware, using a thin copper stencil, before burning? A. Cobalt oxide mixed to suitable consistency with linseed oil and japan.

(20) C. L. asks: What oil can I use to rub into my shoes at night, so that I can polish them in the morning by using ordinary shoe blacking? A. You cannot polish well over leather thus recently treated to soften it. The city bootblacks always find it hard work to get a "shine" on new boots or shoes. A mixture of neatsfoot oil and tallow, about one-half each, makes the best dressing for such use, and the leather should be slightly moist, but not wet, when treated.

(21) H. D. G. writes: 1. Cuff buttons B worn on celluloid cuffs color them. What will remove В the coloring without injury to the cuff? A. The spots R can be removed by washing with sapolio or other suita-B B ble soap. 2. Why do cuff buttons color or stain celluloid cuffs, and not linen? A. It depends on the composition of the cuff buttons. Linen cuffs are often C stained by their gold stems.

Baling press, J. B. Johnson 361,764	Fireplace, J. G. Smith
Battery. See Galvanic battery.	Fishing reel, A. N. Pettengill 361,890
Bed bottom, O. H. Baker 361,665	Flue scraper, E. D. Weston \$61,736
Bell, electric, E. W. Hazazer 362,006	Fiy, artificial, T. B. Mills 361,965
Bell, gong, E. C. Barton 361,807	
Bell, signal, G. W. Eddy 361,751	Fruit drier, S. Stigler 361,905
Bit, J. F. Strange	Funeral advertising device or annunciator, J. E.
Block. See Horse block.	Grosjean
Blower for stoves, adjustable, W. L. Bridgeford 361,809	Furnace. See Gas furnace. Hot air furnace.
Board. See Piano sound board.	Regenerative furnace. Steam and hot air fur-
Boiler, J. Leightham 362,021	nace.
Boiler compounds, apparatus for feeding, J.C.	Furnace attachment, J. M. Dick
Dolan 361,679	Furniture, adjustable and separable, A. J. Cron 361.992
Bolt. See Interlocking bolt.	Fusible cut-out, C. G. Perkins
Book cover, A. J. Kletzker 361,950	Galvanic battery, S. F. Walker
Boot or shoe, Shea & Brown 361,725	Garment supporter, H. H. Buckland 361,984
Boot or shoe burnishing machine, F. P. Baldwin 361,805	Garments, spring or reed for supporting, A. Ben-
Boot or shoe burnishing machine, J. O. Lee 362,020	jamin 361,982
Boring machine, automatic, Morrison & Allen 361.832	Gas burner, G. K. Cooke 361,674
Bottle heads, tool for finishing, C. L. Morehouse 361,774	Gas burners, attachment for, H. T. Foote 361.818
Buckle, J. M. Basinger 361,960	Gascut-off, Field & Hogue 361,684
Buckle, S. E. Moore 362.030	Gas furnace, water, Dwelle & Stapp 361,996
Burial casket fastening, F. B. Craig 362,037	Gas making apparatus, F. H. Hambleton 361,820
Burner. See Gas burner. Vapor burner.	Gas marine engine, explosive, G. Daimler
Burnishing machine, B. F. Patch 862,036	Gas regulator and cut-off, T. J. Kieley
Bustle, C. W. Haynes 361,762	Gate. See End gate. Wagon end gate. Wire
Bustle, C. C. Shelby 361,969	gate.
Button, stud, etc., D. R. Child 361,862	Grain binders, bundie carrier for, W. R. Baker,
Cable, chain, J. M. Dodge 361,865	361,976 to 361,978
Camera. See Photographic camera.	Grain meter, automatic, J. C. King