geometrical definitions, even those which have been accepted by generations of geometricians, are often weak, if not absolutely incorrect.

TREATISE ON PATENT ESTATE. By Thos. B. Hall. Cleveland : Ingham, Clarke & Co. 1888. Pp. 240. Price \$3.

Although many manuals of patent law have lately been issued, yet in the little work before us a some-what different treatment is accorded the subject than that which is usually given it in manuals. The author's plan is characterized by a desire to place the subject on a logical basis. The objects of the patent system and the incorporeal nature of patent rights are first considered as a basis for the work. The property rights of patents, profits, partition, and part ownership are all considered in considerable detail. The action for infringement by one part owner against another is the subject of a separate chapter, and the interesting subject is excellently presented. The propositions throughout the work are based on court decisions, and some times much of the text is made up of quotations therefrom. This gives the book its standard character, and removes from it the emasculating atmosphere that is apt to be created by the study of mere manuals, from which verbal citations of decisions are excluded. The book bas a good table of contents and a full index.

TURNING LATHES. Edited by James Lukin, B.A. London: E. & F. N Spon. 1888. Pp. vi, 160. Price \$1.

This book is an illustrated treatise on lathe work, designed for use in technical schools. The minuteness and practical nature of the directions given, however, make it of value to amateur turners. To those wishing to learn the art from the beginning, it would be hard to recommend a more useful book. Wood and metal turning are both considered, and the description of hand turning is especially full.

The Cosmopolitan Magazine of New York City in its May issue introduced a decided novelty in the way of illustration, consisting of four pages of beautifully colored pictures in embellishment of Moncure D. Conway's rather recondite article on "The Pedigrec of the Devil." The general contents of the magazine, besides, are above the average of those of most of the similar monthly publications, and well calculated to make the Cosmopolitan a popular favorite The subscription price is \$2 a year.

Ferns and Wild Flowers of the Rocky Mountain Region, pressed and well mounted for preservation, are now being furnished by Mr. P. J. Atkin son, of Colorado Springs, Col. They are bound in books varying in size from 31/4 by 41/4 inches to the standard botanical size of 111/2 by 161/2 inches, the prices for which range from 50 cents to \$10 each set. Some specimens we have seen were very beautiful, and the skill and good taste exhibited in their arrangement and presentation left nothing to be desired. Persons making collections of pressed flowers, lcaves, ferns, etc., will derive good information from consulting Mr. At kinson's collection of Rocky Mountain specimens.

Any of the above books may be purchased through this office. Send for new catalogue just published Address MUNN & Co., 361 Broadway, New York.



HINTS TO CORRESPONDENTS.

Minerals sent for examination should be distinctly marked or labeled.

(1) F. J. R. writes: I am making an induction coil 3 x 11/2 inches, and would like to know what sizes of wire I should use, also whether a bundle of iron wires is very much better than a solid iron core? to use on a tin roof, something that will stop leaks as A. For primary use two layers No. 20 wire, and fill up well as preserve the tin. A. Use Prince's metallic with No. 34 wire for secondary. The "bundle" core is paint, or any ground oxide of iron, mixed with linseed far the best.

(2) O. K. writes: I have constructed a simple electric motor, as described in SCIENTIFIC AMERICAN, March 17, 1888, and connected it with an

used in armature? A. Cotton-covered magnet wire is ecommended in the article referred to. The shellac insures a more perfect insulation, and at the same time serves to cement the different layers of wire together. 2. What portions of the field magnet correspond to the north and south poles? A. The poles are above and below the center of the armature. 3. Is it possible to make a dynamo to run the motor? If so, would its conmotor? If so, what would be the changes? A. A motor can be operated by a current from the dynamo. The dynamo could be made upon the same plan as the motor by using a cast iron field magnet and winding the armature with finer wire, say No. 20. 4. Could the efficiency of the motor be increased by using finer wire? A. It depends upon the quality of the current used for running the motor. For a current of high voltage you should use finer wire. 5. Would not the dynamo be a much cheaper source of the electricity than the batteries, provided you have the power to run it (the dynamo)? A. The dynamo is a cheaper source of electricity than batteries. 6. Is it necessary to charge the field magnet of a dynamo when first constructed, or is there enough residual electricity in the iron to start the current? A. Ordinarily, there is enough mag netism resident in the cores of the field magnet to start the current, but it sometimes happens that it is necessary to supply the magnetism from an outside current. 7. I wish to have my pupils construct an electric motor of say 1/2 horse power, also a dynamo to runit. We have the appliances of an ordinary machine shop to aid us. Have you ever published, or intend to publish soon, the details of construction of such a motor and dynamo? If not, where can I find such a de-scription? A. In SUPPLEMENT, No. 600, you will find a description of a small dynamo which would also serve MENT, descriptions of many forms of arc lamps. See our SUPPLEMENT catalogue and SUPPLEMENT, No. 652. We can also supply Arc and Globe Lamps, by Maier, \$3.

(5) C. A. L. asks how to make and put up a mechanical telephone good for a distance of a quarter of a mile. A. For an acoustic telephone use small twisted wire cable picture cord. Stretch it between two disks of thin tin or steel in thickness about No. 34 wire gange. Disks to be 3 inches diameter, fastened with screws between two pieces of hard wood, so made as to pinch the disks all around. The wire to be fastened to the center of the disks by a loop through a soldered eve. The wire may rest in slings of rubber or leather attached to poles about 150 feet apart. The wire should not turn sharp corners. The disks should be set square with the wire at convenient positions to maintain a strong tension upon the wire, as well as convenient for conversation.

(6) J. C. writes: I am making an induction coil on the general principles of one described works very well, but I would like to have a little information. Primary coil has on it four coils of No. 24 Make it of clay or use a flower pot with the hole in its wire. Paper tube for secondary coil measures 11/2 inches outside. Must I use No. 36 wire, or will No. 32, or even heavier, wire answer the purpose? How many layers will be required, keeping in view the fact that I do not want to get it more than 3 inches in diameter, if possible, and what will be approximate weight of wire? A. There is an advantage in using fine wire in the se condary coil, as the entire body wire will be nearer the metallic core. We think you have made a mistake in making your core and primary coil of such large diameter. You should have from 15 to 20 layers of the secondary wire.

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 constitute result or any be had at the office. Price 10 cents each. To may be had at the office. Price 10 cents each.
Stematic any to reasymptic a should be distinctly one peck of lime to a barrel of bones. Cover with water and boil. In twenty-four hours all the bones, with the exception perhaps of the hard shin bones, will become so much suffered as to be easily pulverized by hand.

> (8) W. M. M. asks the best kind of paint oil.

(9) C. R. M. asks a good cement for leather belting. A. Take of common glue and isinglass equal parts, soaked for ten hours in just enough water Edison light circuit, and it melts the brushes. A. You to cover them. Bring gradually to a boiling heat and should reduce the current by introducing resistance, add pure tannin until the whole becomes ropy or ap-

(12) C. E. L. asks: What will drive out large black ants from a pantry? A. Red pepper, sulphur, kerosene, carbolic acid, and similar substances are efficacious in driving ants away.

(13) O. R. R. writes: 1. There is a no tion prevalent in this vicinity that, in order to have good well water, the well must be open so as to exstruction differ in any way from the construction of the pose the water to the air, and also that some way of raising the water which agitates it is to be preferre . How much truth is there in the above? A. Agitation and exposure to the air is valuable as a means of destroying organic matter in water. 2. What is the reason that dynamite will explode by percussion, but not by fire? Would a very hot iron cause it to explode A. It is often impossible to assign a reason for chemical facts. A sudden heat applied to the whole mass might cause an explosion, while the local application would fail.

> (14) F. G. asks how to drill by hand a one-half or three-fourths inch hole through a plate of glass one-fourth of an inch thick, for a Wimshurst electrical influence machine. The glass disks are eighteen inches in diameter, and each is to carry sixteen sectors. A. Clamp over the glass disk a board having in it a thirteen-sixteenths inch round hole, the hole to be arranged exactly over the center of the disk. On a brass or copper tube six or eight inches long, and % inch in diameter, secure a spool about 2 inches in diameter, and in the top of the tube insert a hard wood handle having a shoulder which will bear upon the top of the tube. Provide a long bow with strong catgut cord, and operate the tube like a bow drill. Keep the hole in the board supplied with coarse emery and water.

(15) G. E. T. asks: Can you give genas a motor. 8. Have you ever published anything re- eral proportions for increasing the capacity of the dygarding the construction of an electric lamp (arc)? A. namo machine described in SUPPLEMENT to 24 or 32 You will find in the back numbers of the SUPPLE 16 candle power lamps? Does it make any material difference whether the rings of the armature are cast or wronght? How should the machine be mounted? A. If you increase the dimensions one-half (linear), the dynamo will run from 24 to 30 lights. The rings of the armatures should be of wrought iron. The machine should be mounted upon a frame so as to be adjustable, for the purpose of tightening the belt. The belt should be seamless.

> (16) G. W. G. asks: What will destroy roaches or drive them away? A. Use fresh borax and Persian insect powder continuously until the pests are exterminated. Or use a phosphoric paste, of which there are several kinds to be had at drug stores. It should be mixed with a little molasses, and put on bits of cardboard or paper, distributed around infested places. The practice should be kept up some time after the pests have apparently disappeared, on account of young ones coming out, say for three or four weeks.

(17) W. C. T. asks if common putty. such as used to put in window glasses, could be used in SUPPLEMENT, No. 569. Primary coil is finished, and ' to make the porous cup of a galvanic battery. If not, what is a good way to make one? A. Putty is uscless. bottom corked up.

> (18) N. P. K. asks how to polish black marble. A. The process embraces five stages, beginning with the use of coarse materials and finishing with dry rags. A full description of it is given in Spons' Workshop Receipts," first series, in an article entitled We can supply the book for \$2. Marble Working."

> (19) C. S. asks: What will stick celluloid to paper, wood, glass, etc.? A. Trythe following Gum shellac 1 ounce, camphor 1 ounce, alcohol ounces. Dissolve and filter.

> (20) C. S. W. asks a recipe for making compressed yeast, also called German yeast. A. It is obtained by straining the common yeast in breweries and distilleries, until a moist mass is obtained, which is then placed in hair bags, and the rest of the water ed out until the mass is nearly dry.

> (21) J. H. N. asks how to wake a varnish of bleached shellac to be used in the place of the common shellac dissolved in alcohol. A Break the gum in small pieces, and macerate in a stoppyed bottle with ether; after swelling up sufficiently the A cess of ether is poured off, and it will readily dissolve in alco hol.

> (22) R. C. asks (1) the proper name the apply to a person who makes insects a study. A. Entomologist. 2. A recipe for an effective insect powder A. See "Two Valuable Insecticides," contained in Sci-ENTIFIC AMERICAN SUPPLEMENT, No. 218. Powdered subbur is likewise efficacious in many instances.

(23) A. H. T. asks: 1. What chemical action takes place when milk sours, and why? A. The milk sugar which it contains decomposes into lactic acid. This process is known as lactic fermentation. See the article on fermentation in any cyclopedia. 2. How to prevent milk from souring. A. Milk is best preserved by the addition of a few grains of bicarbonte of soda or potash, and placing in a tightly corke

### TO INVENTORS.

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

# INDEX OF INVENTIONS

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

### June 12, 1888.

## AND PACE DEADING THAT DATE

[See note at end of list about copies of these patents.]
Adding and writing machine, A. C. Ludlum 384,373
Adjusta ble joint, G. C. Sweett
Air compressor, W. T. Forster
Air compressor, automatic, G. J. Keenan
Alarm. See Time alarm.
Animal trap, P. T. Beach 384,415
Animal trap, P. T. Beach
slaughtered, E. Ekker 384,433
Annunciator, electrical, H. S. Downerd 384,430
Arm or hand rest, W. M. Kinnard
Astronomical apparatus, E. L. Rugg
Axies for vehicles, manufacture of, J. G. Harri-
son
Back band loop, E. R. Cahoone
Bag. See Hand bag.
Bag holder, W. F. Lewis
Baling press, E. C. Sooy 384,294
Batteries, automatic switch for secondary, J. S.
Sellon
Batteries, regulating commutator for secondary,
E. Julien
Bearing for shafts, anti-friction, W. J. Brewer 384,506 Bed bottom, spring, W. H. Pennock
Bed inflating and heating apparatus combined, in-
valid, R. K. Pelton
Belt fastener, H. Elmblad 384,434
Belt fastener, W. N. Packer 384,465
Belting, machine for manufacturing rubber, J.
Murphy (r) 10,938
Bench stop, I. H. Terrell
Bicycle, A. F. Price
Blacking box holder, W. Taylor 384,338
Block. See Building block.
Board. See Gang board. Boiler. See Steam boiler.
Boiler for hot water heaters, Neil & Morrison 384,461
Bolt, C. Die bold
Bolting reel, D. L. Hamaker 384,520
Book and making the same, record, J. W. See 384,288
Book, turf racing record, P. Mitchell 384,266
Boot or shoe, G. S. Frantz
Bottle necks, machine for finishing, H. Semple 384,290 Bottle opener and liquid dropper, combined, E. S.
bottle opener and nould dropper, com pined, B. S.
Randall 384,471
Randall
Randall.       384,471         Box. See Letter box. Stuffing box.       Bracket.         Bracket. See Gas bracket.       Brake. See Car brake. Sled brake.         Brick kiln frame, E. M. Pike et al.       384,469         Bridle and halter, combined, J. O. Walton.       384,469         Bridle and halter, combined, J. O. Walton.       384,469         Buck kin frame, E. M. Pike et al.       384,469         Buck kin frame, E. M. Pike et al.       384,469         Buck kin frame, E. M. Pike et al.       384,461         Buck kin frame, E. M. Pike et al.       384,462         Buck kin frame, E. M. Pike et al.       384,462         Buck kin frame, E. M. Pike et al.       384,461         Buck branch and other, R. Nicol, Jr.       384,454         Burg bushing, R. Pentlarge.       384,357         Butrern. See Oil burner. Stove burner.       384,452         Butter mould, F. P. Ayer.       384,353         Button making device, J. Stewart.       384,454         Calculator, interest, C. M. Dunham.       384,454         Car champ, fruit, M. J. Hamlin.       384,557         Car coupling, C. L. Baittinger.       384,557         Car coupling, F. A. Fox.       384,557         Car coupling, F. A. Fox.       384,557         Car coupling, F. A. Fox.
Randall.384,471Box. See Letter box. Stuffing box.Bracket.Bracket. See Gas bracket.Brake. See Car brake. Sled brake.Brick kiln frame, E. M. Pike et al.384,469Bridle and halter, combined, J. O. Walton.384,462Buckk frames, manufacture of, G. R. Kelsey.384,469Buidling block, H. S. Palmer.384,464Bung bushing, R. Pentlarge.384,357Burner. See Oil burner. Stove burner.384,357Butter mould, F. P. Ayer.384,362Button, Anderson & Pattison.384,573Button making device, J. Stewart.384,537Calculator, interest, C. M. Dunham.384,537Car coupling, C. L. Baittinger.384,557Car coupling, F. A. Fox.384,557Car coupling, F. A. Fox.384,557Car coupling, J. Scott.384,557Car coupling, J. Scott.384,557Car coupling, J. Scott.384,557Car coupling, J. Scott.384,551Car cearing apparatus, W. F. Steele.384,474Car coupling device, W. N. Morrison.384,551Car coupling device, W. N. Morrison.384,561Car heating apparatus, W. F. Steele.384,401
Randall.384,471Box. See Letter box. Stuffing box.Bracket.Bracket. See Gas bracket.Brake. See Car brake. Sled brake.Brick kiln frame, E. M. Pike et al.384,469Bridk and halter, combined, J. O. Walton.384,462Buckke frames, manufacture of, G. R. Kelsey.384,462Buckke frames, manufacture of, G. R. Kelsey.384,463Bung bushing, R. Pentlarge.384,363Burner. See Oil burner. Stove burner.384,567Butter mould, F. P. Ayer.384,564Calculator, interest, C. M. Dunham.384,564Calculator, interest, C. M. Dunham.384,564Car coupling, C. L. Baittinger.384,564Car coupling, P. C. Greenawalt.384,554Car coupling, P. C. Greenawalt.384,575Car coupling, P. Kott.384,576Car coupling, J. Scott.384,473Car coupling, J. Scott.384,474Car coupling device, W. N. Morrison.384,536Car heating apparatus, railway, E. A. Leland.384,536Car heating apparatus, railway, E. A. Leland.384,537
Randall.384,471Box. See Letter box. Stuffing box.Bracket.Bracket. See Gas bracket.Bracket.Bracket. See Gas bracket.Brake. See Car brake. Sled brake.Brick kiln frame, E. M. Pike et al.384,407Brush, shoe and other, R. Nicol, Jr.384,407Buckk frames, manufacture of, G. R. Kelsey.384,402Building block, H. S. Palmer.384,537Burner. See Oil burner. Stove burner.384,357Butter mould, F. P. Ayer.384,363Button, Anderson & Pattison384,273Button making device, J. Stewart.384,537Car brake, J. H. Brown384,557Car coupling, C. L. Baittinger.384,557Car coupling, F. A Fox384,557Car coupling, P. A fox384,557Car coupling, P. A. Fox384,359Car coupling, P. A. Fox384,359Car coupling, P. A. Stott.384,359Car coupling, J. Scott.384,557Car coupling device, W. N. Morrison384,557Car coupling device, W. N. Morrison384,557Car coupling device, W. N. Morrison384,557Car coupling device, W. N. Steele.384,545Car heating apparatus, W. F. Steele.384,545Car heating apparatus, T. A. Leland.384,545Car heating apparatus, T. A. Leland.384,545Car heating apparatus, T. A. Leland.384,545
Randall.384,471Box. See Letter box. Stuffing box.Bracket.Bracket. See Gas bracket.Bracket.Brake. See Car brake. Sled brake.Bridle and halter, combined, J. O. Walton.384,469Bridle and halter, combined, J. O. Walton.384,462Buck kiln frame, E. M. Pike et al.384,462Bursh, shoe and other, R. Nicol, Jr.384,462Buck frames, manufacture of, G. R. Kelsey.384,462Buck frames, manufacture of, G. R. Kelsey.384,462Buding block, H. S. Palmer.384,537Burner. See Oil burner. Stove burner.Butter mould, F. P. Ayer.Butter, J. Brand.384,537Button, Anderson & Pattison.384,431Calculator, interest, C. M. Dunham.384,431Calculator, interest, C. M. Dunham.384,452Can champ, fruit, M. J. Hamlin.384,554Car coupling, C. L. Baittinger.384,554Car coupling, F. A. Fox.384,557Car coupling, F. A. Fox.384,557Car coupling, J. Scott.384,575Car coupling, J. Scott.384,575Car coupling, J. Scott.384,552Car heating apparatus, K. F. Steele.384,561Car heating apparatus, W. F. Steele.384,561Car mover, J. Bird.384,551Car mover, J. Bird.384,552Car unover, J. Bird.384,552Car mover, J. Bird.384,552Car theating apparatus, railway, E. A. Leland.384,552Car mover, J. Bird.384,552
Randall.384,471Box. See Letter box. Stuffing box.Bracket.Bracket. See Gas bracket.Bracket.Bracket. See Gar brake. Sled brake.Bridle and halter, combined, J. O. Walton.Bridle and halter, combined, J. O. Walton.384,462Buckke frames, manufacture of, G. R. Kelsey.384,462Buckke frames, manufacture of, G. R. Kelsey.384,462Buckle frames, manufacture of, G. R. Kelsey.384,462Buckle frames, manufacture of, G. R. Kelsey.384,462Buckle frames, manufacture of, G. R. Kelsey.384,462Butke, F. J. Brand.384,537Button. Anderson & Pattison.384,273Button making device, J. Stewart.384,547Calculator, interest, C. M. Dunham.384,547Calculator, interest, C. M. Dunham.384,546Car coupling, C. L. Baittinger.384,536Car coupling, F. A. Foz.384,547Car coupling, F. C. Greenawalt.384,536Car coupling, J. Scott.384,473Car coupling, J. Scott.384,474Car coupling, J. Scott.384,536Car cheating apparatus, W. F. Steele.384,401Car heating apparatus, W. F. Steele.384,401Car heating apparatus, W. F. Steele.384,402Car heating apparatus, W. F. Steele.384,401Car heating apparatus, Tailway, E. A. Leland.384,536Car starter, H. R. Keller.384,536Car starter, H. R. Keller.384,536Car starter, H. R. Keller.384,536Car seture of the structures, apparatus for heat-
Randall.384,471Box. See Letter box. Stuffing box.Bracket.Bracket. See Gas bracket.Bracket.Bracket. See Gar brake. Sled brake.Bridle and halter, combined, J. O. Walton.Bridle and halter, combined, J. O. Walton.384,462Buckke frames, manufacture of, G. R. Kelsey.384,462Buckke frames, manufacture of, G. R. Kelsey.384,462Buckle frames, manufacture of, G. R. Kelsey.384,462Buckle frames, manufacture of, G. R. Kelsey.384,462Buckle frames, manufacture of, G. R. Kelsey.384,462Butke, F. J. Brand.384,537Button. Anderson & Pattison.384,273Button making device, J. Stewart.384,547Calculator, interest, C. M. Dunham.384,547Calculator, interest, C. M. Dunham.384,546Car coupling, C. L. Baittinger.384,536Car coupling, F. A. Foz.384,547Car coupling, F. C. Greenawalt.384,536Car coupling, J. Scott.384,473Car coupling, J. Scott.384,474Car coupling, J. Scott.384,536Car cheating apparatus, W. F. Steele.384,401Car heating apparatus, W. F. Steele.384,401Car heating apparatus, W. F. Steele.384,402Car heating apparatus, W. F. Steele.384,401Car heating apparatus, Tailway, E. A. Leland.384,536Car starter, H. R. Keller.384,536Car starter, H. R. Keller.384,536Car starter, H. R. Keller.384,536Car seture of the structures, apparatus for heat-
Randall.384,471Box. See Letter box. Stuffing box.Bracket.Bracket. See Gas bracket.Bracket.Brake. See Car brake. Sled brake.Bridle and halter, combined, J. O. Walton.384,469Bridle and halter, combined, J. O. Walton.384,462Buck kiln frame, E. M. Pike et al.384,462Bursh, shoe and other, R. Nicol, Jr.384,462Buck frames, manufacture of, G. R. Kelsey.384,462Buck frames, manufacture of, G. R. Kelsey.384,462Buding block, H. S. Palmer.384,537Burner. See Oil burner. Stove burner.Butter mould, F. P. Ayer.Butter, J. Brand.384,537Button, Anderson & Pattison.384,431Calculator, interest, C. M. Dunham.384,431Calculator, interest, C. M. Dunham.384,452Can champ, fruit, M. J. Hamlin.384,554Car coupling, C. L. Baittinger.384,554Car coupling, F. A. Fox.384,557Car coupling, F. A. Fox.384,557Car coupling, J. Scott.384,575Car coupling, J. Scott.384,575Car coupling, J. Scott.384,552Car heating apparatus, K. F. Steele.384,561Car heating apparatus, W. F. Steele.384,561Car mover, J. Bird.384,551Car mover, J. Bird.384,552Car unover, J. Bird.384,552Car mover, J. Bird.384,552Car theating apparatus, railway, E. A. Leland.384,552Car mover, J. Bird.384,552
Randall.384,471Box. See Letter box. Stuffing box.Bracket.Bracket. See Gas bracket.Bracket.Bracket. See Gas bracket.Brake. See Car brake. Sled brake.Brick kiln frame, E. M. Pike et al.384,469Bridle and halter, combined, J. O. Walton.384,469Buckk frames, manufacture of, G. R. Kelsey.384,469Building block, H. S. Palmer.384,557Bushing, R. Pentlarge.384,357Butrner. See Oil burner. Stove burner.384,451Button, Anderson & Pattison.384,473Button making device, J. Stewart.384,451Calculator, interest, C. M. Dunham.384,451Calendar, memorandum, A. H. Isbell.384,557Car coupling, F. A. Fox.384,557Car coupling, P. C. Greenawalt.384,557Car coupling, F. A. Fox.384,557Car coupling, J. Scott.384,557Car arang apparatus, railway, E. A. Leland.384,552Car theating apparatus, W. F. Steele.384,650Car mover, J. Bird.384,557Car and similar structures, apparatus for heating, W. F. Steele.384,450Car sand similar structures, apparatus for heating, W. F. Steele.384,557Car sand similar structures, apparatus for heating, W. F. Steele.384,550Car sand similar structures, apparatus for heating, W. F. Steele.384,550Car sand similar structures, app
Randall.384,471Box. See Letter box. Stuffing box.Bracket.Bracket. See Gas bracket.Bracket.Brake. See Car brake. Sled brake.Bridle and halter, combined, J. O. Walton.384,462Bridle and halter, combined, J. O. Walton.384,462Buckk kiln frame, E. M. Pike et al.384,462Buckk frames, manufacture of, G. R. Kelsey.384,462Buckle frames, manufacture of, G. R. Kelsey.384,462Buckle frames, manufacture of, G. R. Kelsey.384,452Buckle frames, manufacture of, G. R. Kelsey.384,543Bung bushing, R. Pentlarge.384,557Burner. See Oil burner.384,557Butter mould, F. P. Ayer.384,563Button, Anderson & Pattison384,532Calculator, interest, C. M. Dunham.384,531Calculator, interest, C. M. Dunham.384,531Car coupling, C. L. Baittinger.384,531Car coupling, F. A. Fox.384,532Car coupling, P. C. Greenawalt384,551Car coupling, J. Scott.384,474Car coupling, J. Scott.384,474Car coupling, J. Scott.384,452Car heating apparatus, railway, E. A. Leland.384,551Car heating apparatus, railway, E. A. Leland.384,552Car sand similar structures, apparatus for heating, W. F. Steele.384,402Car satter, H. R. Keller.384,568Cars and similar structures, apparatus for heating, W. F. Steele.384,400Cars, ardught timber for, J. B. Owens.384,568Cars, draught timber for, J. B. Owens.384,568
Randall.384,471Box. See Letter box. Stuffing box.Bracket.Bracket. See Gas bracket.Brake. See Car brake. Sled brake.Brick kiln frame, E. M. Pike et al.384,469Bridle and halter, combined, J. O. Walton.384,469Buck kiln frame, E. M. Pike et al.384,469Buck kin frame, E. M. Pike et al.384,469Buck kin frame, E. M. Pike et al.384,469Buck kin frame, E. M. Pike et al.384,469Buck frames, manufacture of, G. R. Kelsey.384,449Building block, H. S. Palmer.384,547Burner. See Oil burner. Stove burner.384,557Butter mould, F. P. Ayer.384,363Button, Anderson & Pattison.384,547Button making device, J. Stewart.384,547Calculator, interest, C. M. Dunham.384,541Calendar, memorandum, A. H. Isbell.384,547Car coupling, C. L. Baittinger.384,557Car coupling, F. A. Fox.384,557Car coupling, F. A. Fox.384,557Car coupling, J. Scott.384,474Car coupling, J. Scott.384,471Car coupling, J. Scott.384,474Car coupling, J. Scott.384,474Car coupling, E. Julien.384,581Car heating apparatus, railway, E. A. Leland.384,582Car and similar structures, apparatus for heating, W. F. Steele.384,400Car heating apparatus, railway, E. A. Leland.384,582Car and similar structures, apparatus for heating, W. F. Steele.384,400Card rack, A. S. Greenwood.384,432Ca
Randall.384,471Box. See Letter box. Stuffing box.Bracket.Bracket. See Gas bracket.Bracket.Bracket. See Car brake. Sled brake.Bridle and halter, combined, J. O. Walton.Bridle and halter, combined, J. O. Walton.384,462Buckle frames, manufacture of, G. R. Kelsey.384,462Buckle frames, manufacture of, G. R. Kelsey.384,463Butg bushing, R. Pentlarge.384,537Burner. See Oil burner. Stove burner.Butter mould, F. P. Ayer.Butter, J. Brand.384,547Calculator, interest, C. M. Dunham.384,547Calculator, interest, C. M. Dunham.384,547Car coupling, C. L. Baittinger.384,546Car coupling, P. C. Greenawalt.384,536Car coupling, J. Scott.384,473Car coupling, J. Scott.384,474Car coupling, J. Scott.384,474Car coupling, J. Scott.384,474Car coupling device, W. N. Morrison.384,536Car starter, H. R. Keller.384,536Car starter, H. R. Keller.384,470Car starter, H. R. Keller.384,400Car heating apparatus, railway, E. A. Leland.384,536Cars ard similar structures, apparatus for heatting, W. F. Steele.384,400Cars attrice, H. R. Keller.384,546Cars, draught timber for, J. B. Owens.384,546Card rack, A. S. Greenwood.
Randall.384,471Box. See Letter box. Stuffing box.Bracket.Bracket. See Gas bracket.Bracket. See Gas bracket.Brake. See Car brake. Sled brake.Bridle and halter, combined, J. O. Walton.Bridle and halter, combined, J. O. Walton.384,462Buckk frames, manufacture of, G. R. Kelsey.384,462Budking block, H. S. Palmer.384,357Burner. See Oil burner. Stove burner.384,357Butter, J. Brand.384,453Button making device, J. Stewart.384,453Button, Anderson & Pattison.384,473Button making device, J. Stewart.384,454Calendar, interest, C. M. Dunham.384,451Calendar, memorandum, A. H. Isbell.384,557Car coupling, C. L. Baittinger.384,357Car coupling, F. A. Fox.384,357Car coupling, F. A. Fox.384,354Car coupling, J. Scott.384,354Car coupling, J. Scott.384,474Car coupling, J. Scott.384,474Car coupling apparatus, reliver, Bist.384,568Car starter, H. R. Keller.384,568Car starter, H. R. Keller.384,568Cars, street or station indicator for, W. P. Williams.384,483Card rack, A. S. Greenwood.384,588Card graught timber for, J. B. Owens.384,588Card rack, A. S. Greenwood.384,433Care, sheet or station indicator for, W. P. Willings.384,483Card rack, A. S. Greenwood.384,433Care draught timber for, J. B. Owens.384,433Care draught timber for, J.
Randall384,471Box. See Letter box. Stuffing box.Bracket.Bracket. See Gas bracket.Bracket. See Gas bracket.Brake. See Car brake. Sled brake.Bridle and halter, combined, J. O. Walton.Bridle and halter, combined, J. O. Walton.384,462Buckk frames, manufacture of, G. R. Kelsey.384,462Buckk frames, manufacture of, G. R. Kelsey.384,462Buckk frames, manufacture of, G. R. Kelsey.384,462Buckk frames, manufacture of, G. R. Kelsey.384,453Burner. See Oil burner. Stove burner.Butter mould, F. P. Ayer.Butter, J. Brand.384,557Button, Anderson & Pattison.384,431Calculator, interest, C. M. Dunham.384,454Can champ, fruit, M. J. Hamlin.384,557Car coupling, C. L. Baittinger.384,557Car coupling, F. A. Fox.384,557Car coupling, J. Scott.384,552Car coupling, J. Scott.384,552Car mover, J. Bird.384,551Car heating apparatus, w. F. Steele.384,401Car stater, H. R. Keller.384,356Cars and similar structures, apparatus for heating, W. F. Steele.384,402Cars, street or station indicator for, W. P. Williams.384,453Cars, treet or station indicator for, W. P. Williams.384,453Carriage, wheel fender for, Rogers & Stenz.384,453Carriage, wheel fen
Randall.384,471Box. See Letter box. Stuffing box.Bracket.Bracket. See Gas bracket.Bracket. See Gas bracket.Brake. See Car brake. Sled brake.Bridle and halter, combined, J. O. Walton.Bridle and halter, combined, J. O. Walton.384,462Buckk frames, manufacture of, G. R. Kelsey.384,462Budking block, H. S. Palmer.384,357Burner. See Oil burner. Stove burner.384,357Butter, J. Brand.384,453Button making device, J. Stewart.384,453Button, Anderson & Pattison.384,473Button making device, J. Stewart.384,454Calendar, interest, C. M. Dunham.384,451Calendar, memorandum, A. H. Isbell.384,557Car coupling, C. L. Baittinger.384,357Car coupling, F. A. Fox.384,357Car coupling, F. A. Fox.384,354Car coupling, J. Scott.384,354Car coupling, J. Scott.384,474Car coupling, J. Scott.384,474Car coupling apparatus, reliver, Bist.384,568Car starter, H. R. Keller.384,568Car starter, H. R. Keller.384,568Cars, street or station indicator for, W. P. Williams.384,483Card rack, A. S. Greenwood.384,588Card graught timber for, J. B. Owens.384,588Card rack, A. S. Greenwood.384,433Care, sheet or station indicator for, W. P. Willings.384,483Card rack, A. S. Greenwood.384,433Care draught timber for, J. B. Owens.384,433Care draught timber for, J.

or what is better, place it in a shunt. By a little experiment you will soon arrive at the proper resistance.

(3) J. C. H.-Surface tension or the attraction of cohesion is the principal reason why mercurv does not distribute itself all along the tubes when thermometers are laid horizontally. In many thermometers that have large tubes the mercury will separate by turning them bottom end up, and in a few the tube will fill solid by overturning. Mercury expands in bulk as 1 to 1.0154 when the temperature varies from 32° to 212º Fah. Alcohol 1 to 1'11. The expansion of the solid metals is usually expressed as linear; a rod of iron 100 feet long will expand 0.00326 in. for each degree Fah. of rise in temperature, and for a rod 100 feet long of the following metals, the expansion for each degree Fah. will be:

Gold0.0101 in.	Silver 0'0127 in.
Copper0.0115 in.	Brass 0.0125 in.
Lead0.019 in.	Zinc
Tin0.0145 in.	Platinum0.00571 in.

the construction of the simple electric motor, could not the twine with salt brine will keep insects from cat- articles with this, and finally rub with soft blottin insulated wire be substituted for the shellac-covered wire ting it.

pears like the white of eggs. Buff off the surfaces to be joined, apply this cement warm, and clamp firmly.

(10) T. S. A. desires (1) a good recipe for lemon sugar, one that will not taste too much of the sugar, and be insipid. A. Citric acid 1 ounce. white sugar 2 pounds, essence of lemon 1/4 ounce; powder and keep dry for use. One dessertspoonful will make a glass of lemonade. 2. A recipe for old fashioned ginger pop beer. A. See the recipes given in SCIEN-TIFIC AMERICAN SUPPLEMENT, No. 270, under the title of "Effervescing Beverages."

(11) G. A. D. writes: In the West a great deal of grain is bound with twine made from manila. Has there ever been any effort made to manufacture binder twine from flax, and what success has it had? Is flax twine any more ant to be "cut" by insects than manila twine? How should twine be treated to prevent insects from gnawing off the bands? A. Binder twine was made from flax in the early days of the rust off drawing instruments without injuring

bottle.

(24) N. A. E. asks how to make ros perfume or rose water. A. Dissolve attar of roses, drachms avoirdupois, in strongest alcohol hot, 1 imperia pint; throw the solution into a 12 gallon carboy, and add 10 gallons pure distilled water at 180°-185° Fah. A once cork the carboy, at first loosely, and agitate th whole briskly, although at first cautiously, till quite cold See also "Rose Oil or Otto of Roses" in SCIENTIFI AMERICAN SUPPLEMENT, No. 275. We can also suppl you with the Manufacture of Perfumes, by Snively Price \$3.

(25) L. L. U. asks: How much coa will it take to melt 3,000 pounds of light scrap iron in cupola 20 inches diameter? A. From 700 to 1,00 pounds anthracite.

(26) A. F. M. desires a receipt for taking the resper. The manila twine is the cheapest. Flax is them. A. Mix 10 parts of tin putty, 8 of prepared buck' (4) W. McD. writes: 1. In reference to not affected by insects, to our knowledge. Saturating horn, and 25 of spirits of wine, to a paste. Cleanse the paper.

- 1	
a	Case. See Map case. Watch case.
"	Cash register and indicator, W. W. Wythe 384.490
	Cash tills, recorder for, G. R. Stokes et al 384,337
<u>ہ</u>	Casting machines, elevator for ingot, J. B. D. Bol-
~ 1	ton
6	Catamenial sack, J. Hothersall
մ	Cement, manufacture of articles from hydraulic,
d	J. W. Stockwell
t	Chalk line holder, B. Howard 384,444
e I	Change receiver, J. A. Kimball 384,583
ī, i	Check, price and inventory, C. S. De Witt
c	Check register or tally, A. B. Gill 384.438
- 1	Checkrein, B. Miller 384,460
y .	Chin rest for the dead, C. B. Dolge 384,513
	Chopper. See Cotton chopper.
	Churn, C. E. Gale 384,518
1	Cigar bunching machine, Boehm & Reed 384,556
8	Clamp. See Can clamp. Rubber dam clamp.
	Clasp. See Shoe clasp.
0	Clay disintegrator, G. Potts 364,278
	Clock, electric pendulum, A. L. Parcelle
3	Clocks, electric winding attachment for, A. J.
-	Reams
g	Clothes washer, atmospheric, H. T. Lemon 384,453
8	Clutch, friction, A. Nelson 384,268
e	Cocoanut meat, machine for cutting, J. O. Bar-
Rİ	tholomew
	Coin receptacle and register, Headley & Horton., 584,523