

speed should be about 6 feet, more or less, to suit the model and allowed draught of the vessel. The pitch should also vary with the lines of the boat, longer for a sharp, fine-lined boat than for a boat of burden or a tugboat. A pitch of 1 7/8 to 1 1/2 times the diameter is about the range for different models and uses of steam vessels. For the speed of engine as stated, probably a pitch of 8 feet for a 6 foot wheel in a boat built for speed can be recommended. See an excellent work by Kunhardt on "Steam Yachts and Launches," \$3 by mail. 2. Please give simplest method of determining and finding the pitch of a propeller wheel. A. There is no simple method of determining the size or pitch of a screw propeller. The resistance of the vessel, depth of draught, required speed, and power are all factors for size and pitch of screw propellers. 3. Where can I get the patent Bartlett wheel in America? A. We do not find that the Bartlett wheel is made under that name by makers of propeller wheels in this vicinity.

(5942) E. P. says: Will you kindly tell me how the carbon for arc lights is made and what is the material used? A. Clean pieces of coke are selected, pulverized, and passed through a fine sieve. It is then thoroughly mixed with from one-sixth to one-eighth its bulk of wheat flour, both being in a dry state. The mixture is moistened with water containing a small percentage of molasses. It should be allowed to stand for two or three hours in a closed vessel to prevent the evaporation of the water. At the end of this time the mixture may be pressed into moulds of any desired form, then removed from the moulds and dried, slowly at first, afterward rapidly, in an ordinary oven at a high temperature. When the rods or plates thus formed are thoroughly dried they are packed in an iron box, or, if they are small, in a crucible and completely surrounded by coke dust. The box or crucible must be closed by a non-combustible cover. Then place in a fire and heat to a red heat for an hour or so, then allow the box to cool, remove the carbons, then boil for half hour in thin sirup or molasses water, then bake in an ordinary oven and re-carbonize as already described.—From "Experimental Science." This same applies to battery plates.

(5943) J. T. T. asks: 1. For formula for making sealing compound suitable for dry batteries. A. Use resin 4 parts, gutta parcha 1 part, melted together with a little boiled oil. 2. For full directions for amalgamating zinc cup, such as used in dry batteries. A. Do not amalgamate it, as amalgamation renders zinc very brittle. If you must do so, wash the inner surface with a slightly acid solution of mercury nitrate. 3. In attempting to amalgamate a cup of zinc, sed dilute sulphuric acid (acid 1 part to 10 parts water) for cleaning zinc and then applied few drops mercury on inside cup, rubbing it over surface by means of brush, but bottoms of cans would unsolder and drop out. On examination of zinc found it like rotten, being easily pulled in pieces. What caused this? A. You used too much mercury, but it will always make zinc brittle. 4. What amount of No. 32 cotton-covered magnet wire is necessary for making an electromagnet, having core 3/4 by 2 inches, using Norway iron? A. Wind it to a total diameter of 3/4 inch.

(5944) H. M. writes: In mounting condensers for magic lanterns, how close should they be placed together? A. Place them, if double, with convex sides inward and generally not more than a quarter of an inch apart. If there are three, you may determine the proper setting by trial.

(5945) J. C. M. asks for the best method of tempering the steel for the magnets used in the Bell telephone. A. Heat to a cherry red the ends only of the steel bars, plunge them in water to harden them, and draw the temper to a dark straw color or bronze bordering on purple.

(5946) R. F. W. asks: 1. In making dynamo described in SUPPLEMENT, No. 600, will not brass do just as well as bronze for the yokes? A. Brass will answer the purpose, but not as well as bronze. 2. Copper as well for the commutator as bronze? A. Yes, provided it is hard rolled. 3. If you have any papers giving full working drawings and complete description of the construction of a folding canvas canoe, will you please give the number? If you have no paper on a folding canoe, can you give me one on an ordinary canvas canoe? A. For an answer to this query we refer to SUPPLEMENT, No. 181, which contains a full description of a folding canvas canoe.

(5947) G. W. asks: 1. Can I obtain a sufficient spark to ignite the gaseous mixture in an oil engine by winding copper wire around a soft iron core? A. Yes. 2. If so, what size core and length of wire will be required? A. On a bundle of No. 18 soft iron wires 3/4 of an inch in diameter and 8 inches long, wind No. 20 wire to the depth of 1 1/4 inches.

(5948) S. L. P. asks how dents are taken out of cornets and other brass horns. A. If the dents are inaccessible, so that tools cannot be applied to them on the inside of the horn, you can take them out after a fashion by ordering to the deepest part of the dent a wire and drawing the metal out, afterward un-soldering the wire and cleaning the surface of the brass. If the part of the horn containing the dents is of uniform diameter, you can draw through the horn a spherical metallic button that will fit the tube. If you desire a perfect job, it will be better for you to send the horn to an instrument maker.

(5949) J. asks whether fish oil is injurious to rubber goods. Also what effect it would have when applied to rubber hose? A. Fish oil has a deteriorating effect on rubber. It tends to soften hose.

(5950) F. H. W. asks for a formula for a quick dry plate hardener, or something he can put on the plate that will dry rapidly by heat (without causing the film to run), in order to get a print shortly after development. A. The following is said to be a good gelatine hardener: The negative, after fixing and washing in the usual manner, is treated with a hardening solution composed of chloride of aluminum 5 to 12 grains, water 1 ounce. The stronger the aluminum solution, the greater the amount of heat the negative can stand without softening. The plate is immersed in the solution, and allowed to remain therein for a short time, and after immersion can be dried in sunlight or by artificial heat without danger of deterioration.

(5951) W. C. S. writes: 1. In the SCIENTIFIC AMERICAN for February 24, 1894, is given a description of a magneto call bell for telephones. Could I make a cheaper call? A magneto bell is rather expensive. A. On page 162, current volume of SCIENTIFIC AMERICAN, under the head of "Telephone Experiments," you will find a description of a simple telephone call, which is effective for quiet places. 2. Will you give me a receipt for a stove polish? A. Mix 5 parts, by weight, of black lead (plumbago), 5 parts of boneblack, 10 parts of iron sulphate. Mix thoroughly and make into a paste with water.

(5952) Nick wants to make a sign having the letters smooth and clear, the balance of ground to be chipped or torn off and left rough. No particular pattern. A. Clean the glass thoroughly, then apply a solution of good glue or of gelatine to the portions to be chipped. On drying, the glue or gelatine will contract and chip the glass.

(5953) Y. M. C. A. says: Would you kindly inform me, through your answer department of SCIENTIFIC AMERICAN, how to resilver a mirror? A. See page 183 of the issue of the SCIENTIFIC AMERICAN for March 24, 1894.

(5954) J. R. S. asks: 1. What is the receipt for making laundry starch and mode of using same so as to produce a gloss when applied with a hand iron, such as used in families doing their own washing and ironing? A. One ounce each of gum arabic and borax are dissolved in 10 ounces of water; 1 ounce each of white wax and spermaceti are melted, and while liquid are rubbed with the solution of borax and 10 drops oil of cloves to make emulsion, mixing them thoroughly. A teaspoonful of this mixture in a pint of starch gives a fine polish. It may also be applied after starching by rubbing over the starch with a cloth and then polishing with the iron. The starch mentioned above is the ordinary dry starch made into a paste with hot water. 2. What is a formula for making black ink? A. Black Ink.—Gallnuts, coarsely powdered, 75 parts; sulphate of iron, 42 1/2 parts; over this pour 2,000 parts of cold water. Digest for twenty-four to forty-eight hours. Strain through a cloth and add 24 parts gum arabic.

(5955) C. W. H. writes: I am going to lay 1,800 feet of piping to carry water from a pond to a well. The fall is about 10 feet in the 1,800, with about a 6 foot head, one turn at right angles. What I want to know is this: Which would convey the most water under above conditions—one pipe 4 inches in diameter the entire distance or begin with a 6 inch pipe 600 feet, then 4 inch pipe 600 feet, and then 3 inch pipe the remainder of the distance? Also, about how much water would flow through each of the above systems in 24 hours? A. With a continuous 4 inch pipe you will have a flow of 144,000 gallons per day of 24 hours. With sections of 6 inch, 4 inch, and 3 inch pipe in equal parts, you will have a flow of 129,000 gallons per day. If 1,200 feet of 4 inch, with 600 feet of 6 inch pipe at the pond end, you will have a flow of 180,000 gallons per day.

(5956) P. W. C. says: What is the formula for the combined toning and fixing solution for solio photographic prints, a solution which does not need mixing for use, but is always ready? A.

- No. 1. Sodium hyposulphite..... 10 ounces. Alum potash..... 2 1/2 ounces. Potassium sulphate..... 1 ounce. Sodium sulphate..... 5 ounces. Water (distilled)..... 80 fluid ounces. No. 2. Gold chloride..... 15 grains. Lead acetate..... 6 grains. Water (distilled)..... 8 ounces.

Mix in the proportion of 8 ounces of No. 1 to 1 ounce of No. 2. The mixture is stable and the bath is always ready for use.

(5957) P. O. M. writes: I have a piece of common window glass; by breathing on one side of same the outline of a person is produced as though it was drawn on with milk; but it evaporates with the dampness leaving the glass, and it is not visible again unless the glass is again moistened with the breath. A. The glass to which you refer has been slightly etched with hydrofluoric acid. The etching does not show when the glass is perfectly dry, but moisture develops the image, which disappears as soon as the glass becomes dry.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

April 3, 1894.

AND EACH BEARING THAT DATE.

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

- Accordion, J. Galleazzi..... 517,648 Acid, purifying tannic, B. Rejnus..... 517,628 Air compressor, hydraulic, Schuts & Henderson..... 517,628 Air, gas, etc., receptacle or tank for the storage of compressed, W. Timmis..... 517,777 Alarm, See Burglar alarm. Amalgamator, N. E. Raber..... 517,767 Automatic switch, W. H. Southworth..... 517,566 Bagasse furnace, W. W. Sutcliffe..... 517,497 Band cutter and feeder, Lamm & Sicard..... 517,754 Banjo or violin tail piece, R. H. Small..... 517,498 Batteries, manufacturing active material for secondary electric, W. Boese..... 517,427 Bed rest, J. E. Plummer..... 517,623

- Bed springs, device for tightening woven wire, E. M. Easting..... 517,818 Bedstead, G. E. Proctor..... 517,482 Berth, ship's, E. Lawson..... 517,692 Bicycle, F. B. Hyde..... 517,541 Bicycle, F. W. Byburn..... 517,541 Bicycle saddle, H. Bergfels..... 517,426 Bicycles, variable driving gear, S. C. Eisenhart..... 517,739 Bill or account holder, J. F. Bidder..... 517,590 Billiard table, A. Woegs..... 517,715 Binder for leaves, G. H. Winslow..... 517,635 Bit for cutting rosettes, E. Gollins..... 517,631 Boiler. See Steam boiler. Boiler, E. W. Reynolds..... 517,826 Boiler cleaning compound, F. Berger..... 517,582 Boiler sput, W. S. Shippe..... 517,692 Bolt. See Floor bolt. Bottle, Friedman & Keller..... 517,900 Brake, See Car brake. Elevator brake. Vacuum brake. Bridge, draw, M. G. Schinke..... 517,809 Broom corn sizing machine, G. F. McCombs..... 517,761 Buckle, G. E. Adams..... 517,421 Buckle, self-clamping and locking trace, F. D. Bueckle..... 517,435 Bung, expandible, L. Wagner..... 517,781 Burglar alarm, electric, Frame & Morden..... 517,450 Burglar alarm spring, M. T. Gordon..... 517,547 Bustle, E. Case..... 517,434 Button attaching machine, F. A. Ryno..... 517,486 Button fastening machine, J. C. F. Dick..... 517,604 Button setting apparatus, W. B. Merritt..... 517,757 Camera, H. Casler..... 517,622 Camera, H. Casler..... 517,539 Can discharge attachment, oil, W. Mathews..... 517,618 Can key, self-opening, E. Norton..... 517,667 Cans, key for opening metal, A. Kleinfeldt..... 517,523 Cans, manufacture of metallic preserving, A. W. Livingston..... 517,580 Card cutting apparatus for charging sugar, O. Carr..... 517,730 Car brake, H. B. Cary..... 517,620 Car coupling, R. Dinsmore..... 517,448 Car coupling, E. J. Lahan..... 517,763 Car coupling, L. Segrest..... 517,686 Car coupling, C. H. Taylor..... 517,670 Car coupling, B. M. Whitlock..... 517,604 Car fender, C. P. Anderson..... 517,638 Car fender and automatic brake, W. L. Fitzhugh..... 517,738 Car, railway, O. G. Cates, Jr..... 517,517 Car safety guard, freight, M. Fitzsimmons..... 517,519 Car ventilated freight, W. T. Cottler..... 517,794 Carriage, baby, M. L. Barr..... 517,444 Carriage, practice, G. D. R. Aikin..... 517,719 Case or cabinet, J. K. Ohmer..... 517,477 Cast pitching apparatus, C. Bernreuther..... 517,515 Ceiling or wainscoting board, J. A. Hensel..... 517,521 Cellulose plants, machine for cutting out, F. D. Maltby..... 517,651 Cereals, preparing, W. Onderdonk..... 517,479 Chair. See Folding chair. Chalking apparatus, line, C. E. Anderson..... 517,720 Chimney top and ventilator, J. T. Finch..... 517,797 Chopper. See Cotton chopper. Churn, O. C. Byler..... 517,431 Churn, J. H. H. Duncan..... 517,817 Circuit maker, J. Weaver..... 517,502 Clamp. See Railway rail clamp. Clay articles, glaze for, B. Frey..... 517,609 Clock, J. Smith..... 517,594 Clock synchronizer, electric, H. S. Prentiss..... 517,480 Cloth, mangle, machine for cutting, folding, and piling, F. Meisel..... 517,653 Clothes wringer, C. Wheeler, Jr..... 517,785 Clutch, pneumatic, J. F. Byers..... 517,679 Coal elevators, self-dumping mechanism for, A. Walker..... 517,782 Cook gauge, G. Binder..... 517,426 Cook, M. S. Tracy..... 517,707 Coffee mill, O. Leimbrock..... 517,614 Compass, beam, W. B. Hunter..... 517,636 Continuous kiln, P. L. Youngren..... 517,587 Cooking food over lamp chimneys, utensil for, A. N. Ayres..... 517,561 Cooler. See Wine cooler. Cotton chopper, M. S. Tracy..... 517,458 Cotton chopper, W. H. J. Goodwin..... 517,570 Coupling. See Car coupling. Shaft coupling. Cover for frying pans, etc., M. E. Radick..... 517,708 Crate, berry, P. A. Wimbrow et al..... 517,713 Cremation furnace, S. W. Dixon..... 517,816 Crusher. See Rock crusher. Curb, M. S. Tracy..... 517,673 Curtain fixture, C. E. Goodrich..... 517,453 Curtain stretcher, P. M. Hartpence..... 517,634 Cutter. See Band cutter. Stalk cutter. Desk, adjustable, M. A. Wertheimer..... 517,638 Digger. See Potato digger. Ditching machine, L. A. Stanford..... 517,774 Door bell, A. Angus..... 517,512 Doubling webs of fabric longitudinally, machine for, S. G. Goss..... 517,686 Drawing frame, electric stop motion, E. Tweedale et al..... 517,778 Dresses for protecting bands of flowers, attachment for ladies', F. M. Fletcher..... 517,568 Drier. See Cotton drier. Drying kiln, A. & P. Kimball..... 517,700 Dye, blue, Nastvogel & Reinruber..... 517,473 Dyeing by the aid of paramidodiphenyl min, A. Weinberg..... 517,533 Dynamometer, J. A. Cross..... 517,439 Egg preserving apparatus, E. F. Layman..... 517,463 Electric lights, system for controlling, W. F. Braden..... 517,812 Electric motor, W. J. Still..... 517,668 Electric motor governor, J. F. Winter..... 517,714 Electric switch, R. Mackie..... 517,582 Electric switch, C. F. Speed et al..... 517,773 Electrical switch, G. Buebel..... 517,634 Elevator, E. B. Rich..... 517,768 Elevator and dump, S. E. Kurtz..... 517,702 Elevator brake, self-acting, G. W. Ludovici..... 517,756 Elevator gate, C. Stocker, Jr..... 517,496 Elevation, G. M. King..... 517,522 Enamel for coating sheet metal, etc., J. Henne-mann..... 517,454 Engraving paper or other fabrics, W. H. H. Childs..... 517,732 End gate, wagon, E. K. Hayes..... 517,649 Engine. See Gas engine. Rotary steam engine. Engraving machine, H. A. Chase..... 517,680 Evaporating pan, S. A. Poche..... 517,765 Excavating or dredging machine, J. E. A. Braun..... 517,726 Extruder, E. Hughes & Bro..... 517,430 Fan, revolving, L. D. Boyer..... 517,428 Feedwater pipe heater, J. C. Shaw..... 517,771 Fence, J. E. Phillips..... 517,659 Fence, barbed wire, L. Herweyer..... 517,548 Fence, wire, Bennett & Chapman..... 517,423 Fender. See Car fender. Fertilizer, S. E. Scherer..... 517,496 Fertilizer, phosphatic, N. B. Power..... 517,661 Fertilizers, making, N. B. Power..... 517,662 Filter, C. H. Schultz, Jr..... 517,488 Filtering or purification of liquids, L. Wagner et al..... 517,499 Fire extinguisher, Van Kalker & Bolt..... 517,780 Fish, live box for shell, T. Mann..... 517,652 Flange, T. W. Macfarlane..... 517,704 Flu, sa ety, C. E. Martin..... 517,471 Fluid discharging apparatus, W. T. Messinger..... 517,550 Folding apparatus, G. D. Ackley..... 517,719 Folding chair, S. G. McCullough..... 517,686 Fork, W. G. Beers..... 517,451 Fork cutter attachment, P. P. & J. Dustrud..... 517,736 Fruit cutting and pitting machine, J. F. Rehm..... 517,588 Fruit gatherer, J. K. Wo ward..... 517,786 Furnace. See Bagasse furnace. Cremation furnace. Smoke consuming furnace. Furnace, E. B. Cox..... 517,644 Furnace, F. H. Richards..... 517,627 Furnace, fine fuel, G. Wagner..... 517,632 Gauge. See Liquid gauge. Water gauge. Game apparatus, W. G. Burns..... 517,600 Game apparatus, C. C. Clawson..... 517,436 Garter and gusset therefor, bifurcated, S. B. & F. Lewis..... 517,579 Garter supporter, W. Ogden..... 517,451 Garter adjuster and fastener, W. L. Braddock..... 517,673 Gas engine, Labatille & Graff..... 517,521 Gas from crude oil, making fuel, C. F. A. Convent. Gate. See Elevator gate. End gate. Railway crossing gate. Gasette holder, B. Adam..... 517,420 Generator. See Steam and gas generator. Glass, apparatus for manufacturing plate, E. P. King..... 517,460 Glass melting tank oven, F. Wrede..... 517,675 Grader and amalgamator, J. A. Armbruster..... 517,721 Grading railways, etc., machine for, C. W. Arch..... 517,559 Grain meter, rotating, J. M. Finch..... 517,605 Grain separator, E. E. Hayes..... 517,650 Grate, automatic water circulating fire, Ferris & Wheeler..... 517,577 Grinding machine, D. H. Church..... 517,643 Grooving machine, H. W. Morgan..... 517,705 Gun, cane, R. F. Cook..... 517,438 Gun carriage, anchor for field, Noble & Brack-er..... 517,476 Gun sight, C. Beech..... 517,514

- Gymnastic appliance for school desks, T. Beasing..... 517,768 Hammock, T. B. Thomas..... 517,667 Hanger. See Shade hanger. Harp, W. W. Batchelder, Jr..... 517,723 Harrow disks, machine for sharpening, J. L. Harrow..... 517,610 Harrow, spring tooth, M. J. Todd..... 517,872 Harvester, W. McCloskey..... 517,564 Harvester, cotton, L. R. Turner..... 517,668 Harvester finger, cotton, A. Levedahl..... 517,675 Hasp lock, J. A. Dixon..... 517,685 Hat forming mould, J. Marshall..... 517,470 Heater. See Feedwater pipe heater. Water heater. Heating and ventilating rooms, device for, C. Mills..... 517,759 Heating systems, heater for hot water, F. E. Dack..... 517,683 Hooks for stretching curtains, machine for making, F. Stammann..... 517,776 Horse rake, G. S. Sharp..... 517,491 Hose reel, W. N. Casson..... 517,731 Hosery, still & wood..... 517,583 Hosery cutting apparatus, I. Mossop..... 517,706 Ice cream freezer, J. M. Skipper..... 517,492 Ice machines, pneumatic can hoist for, C. A. Jar..... 517,668 Injector, air, J. G. Stamp..... 517,429 Insulating compound, A. Gentsch..... 517,453 Insulating tube, M. Robinson..... 517,591 Insulator, L. McArthur..... 517,621 Insulator pin, G. H. Winslow..... 517,634 Jack. See Lifting jack. Jar fastening, R. S. Carr..... 517,433 Journey book, drawer, J. H. Surin..... 517,776 Key. See Can key. Kiln. See Continuous kiln. Drying kiln. Kitchen cabinet and churn, combined, Hodges & Dickson..... 517,457 Label holder, W. G. Duckett..... 517,445 Lacing books, machine for setting, J. Keith..... 517,686 Lamp collar, M. E. Atwood..... 517,492 Lamp, incandescent, A. C. Carey..... 517,430 Lamp, miner's safety, Graham & Chapman..... 517,520 Lamps, adjustable desk bracket for electric, Garlock & Marshall..... 517,569 Last, F. E. Benton..... 517,424 Lath centering device, R. L. Levin..... 517,482 Lath saw, J. E. Dickson..... 517,544 Leather driving machine, A. J. Tewksbury..... 517,831 Letter folder, D. D. Howard..... 517,603 Life-boat, C. Baswitz..... 517,536 Lifting jack, B. F. Lewis..... 517,486 Line fastener, W. S. Twitty..... 517,597 Liquid gauge, A. R. Welch..... 517,710 Lock, D. J. Cable..... 517,729 Lubricating device, H. P. Humphrey..... 517,748 Lubricator, J. Longinus..... 517,467 Lubricator, W. O. Nelson..... 517,563 Lumber or composition material, artificial, G. S. Mayhew..... 517,822 Mangle apparatus, feeding mechanism for, G. Conkling..... 517,734 Mail transporting apparatus, R. A. Morgan, Jr..... 517,619 Match box and cigar tip cutter, combined, T. W. Foster..... 517,546 Measuring machine, cloth, G. P. Conant..... 517,437 Metal shaper, combination, H. J. Hendey..... 517,613 Metal shaper, combination, H. J. Hendey..... 517,612 Meter. See Grain meter. Microphone, W. Decker..... 517,564 Milk purifier, R. H. Casswell..... 517,814 Mill. See Coffee mill. Rolling mill. Windmill. Moulding apparatus, J. Shaaber..... 517,489 Moulding machine, W. Edgar..... 517,737 Moulding machine, W. Edgar..... 517,734 Mortising machine, veneer, H. C. Ward..... 517,558 Motor. See Electric motor. Water motor. Musical instrument, mechanical, G. B. Kelly..... 517,712 Necktie, G. Selowsky..... 517,769 Nut lock, J. E. Burrows..... 517,728 Nut rack, M. E. Pugh..... 517,624 Nut making machine, A. Urban..... 517,779 Ordnance, sighting and indicating apparatus for, H. H. Grenfell..... 517,746 Ore separator and classifier, J. P. Foley et al..... 517,739 Packing, piston rod, A. F. Clark..... 517,636 Paper bag, M. E. Pugh..... 517,624 Paper bag making, W. A. Lorenz..... 517,617 Paper feeding mechanism, E. Dummer..... 517,518 Pasting device for sheets, files, strips, etc., A. Day..... 517,684 Pasting table, folding, L. Maurer..... 517,756 Peeling table, fruit, F. M. Anderson..... 517,611 Pen rack, M. E. Pugh..... 517,624 Pencil sharpener, A. Werner..... 517,784 Perforating machine, G. B. Kelly..... 517,758 Photographic camera multiplying attachment, D. S. Cole..... 517,733 Photo. See Insulator pin. Scarf pin. Pipe, clip for use in making joints in cast iron, E. H. Arwing..... 517,611 Pipes in situ, manufacture of monolithic, E. L. Ransome..... 517,806 Pitchers, etc., shield for, M. L. Buckley..... 517,789 Planter, hand corn, P. Schendzelos..... 517,487 Potato digger, J. A. Buck..... 517,516 Pressure, apparatus for indicating and regulating..... 517,461 Printing machine, C. P. Cottrell..... 517,682 Projectile, F. M. Ashley..... 517,620 Pulley, expandible differential, W. Roney..... 517,532 Pump, centrifugal, G. W. Price..... 517,629 Pumping machinery, M. Foster..... 517,449 Rack. See Hand rack. Railway, See Electric. H. A. Gorham..... 517,692 Railway, conduit electric, W. F. Jenkins..... 517,804 Railway, conduit electric, W. C. Keith..... 517,549 Railway crossing gate, G. C. & T. A. Corbin..... 517,729 Railway, induction electric, C. E. Roehl..... 517,531 Railway rail and joint, combination, W. H. McCormick..... 517,551 Railway signal, D. E. Ruffner..... 517,655 Railway rail girder joint, J. M. Price..... 517,660 Railway signal, C. C. Kahne et al..... 517,751 Railway switch, F. Brown..... 517,727 Railway switch, electrically-operated, W. S. Gavey..... 517,743 Railway tie, R. Dinsmore..... 517,447 Railway, W. G. Beers..... 517,451 Railway, underground conduit, W. F. Jenkins..... 517,749 Railways, system of elevated and surface, C. H. Barrows..... 517,536 Rake. See Horse rake. Razor blades, etc., machine for hollowing, J. Leresche..... 517,464 Reel. See Hand reel. Respiration, device for producing, J. M. Pressey..... 517,481 Rheostat, A. J. Shaw..... 517,770 Rock breaker, subaqueous, P. S. Ross..... 517,556 Rock crusher, C. E. Wyman..... 517,717 Rock drilling and boring machine, J. N. Day..... 517,805 Rock drilling and boring, G. M. Githens..... 517,629 Rolling mill, L. G. Braden..... 517,735 Rolling mill, metal, W. E. Harris..... 517,747 Rolls for side bearing suspension rails, P. Eckel..... 517,597 Roof or floor, fireproof, T. A. Lee..... 517,678 Rotary steam engine, W. M. Barnes..... 517,618 Rotary steam engine, W. M. Byrd..... 517,790 Sash balance, W. K. Brown..... 517,730 Sash holder, C. E. Dolliver..... 517,636 Sash holder, C. E. Heil..... 517,747 Sash holder, C. E. Lee..... 517,637 Sash lock and support, J. N. Henry..... 517,456 Scale, druggist's weighing, E. Kelly..... 517,638 Scarf pin, H. Bornstein..... 517,726 Screen. See Window screen. Screw, J. G. Beers..... 517,794 Secondary cell or battery, G. B. Henry..... 517,455 Separator. See Ore separator. Snot separator. Separator bowl, centrifugal, J. J. Davis..... 517,603 Shade hanger, extensible, J. Joseph..... 517,759 Shaft coupling, slip, T. L. Baumgarten..... 517,787 Shelf, book, G. V. Enker..... 517,553 Shingle machine, T. C. Davis..... 517,735 Sifter, ash, J. Youngquist et al..... 517,636 Signal. See Railway signal. Skating rink, Mead & Clemens..... 517,823 Smoke consuming furnace, J. F. Chazotte..... 517,430 Soap server, toilet, H. B. Potter..... 517,524 Snot separator, M. A. Lutzner..... 517,581 Speed varying mechanism, H. H. Cummings..... 517,443 Spindle stop protector, R. Jager..... 517,573 Spinning machinery spindle, Smith & Howson..... 517,772 Spooling machine stop mechanism, Lever & Gruddy..... 517,615 Spooling machines, automatic tension regulator for, W. H. St. George..... 517,486 Spring. See Burglar alarm spring. Watchcase spring. Spring catch, A. Ludwig..... 517,708 Sprinkler. See Lawn sprinkler. Stalk cutter and rake, combined, J. Priestley..... 517,796 Stamp attaching machine, postage, O. J. Moe..... 517,472 Stamp sticking device, C. A. Sprague..... 517,494 Stamp to engrave coppers, machine for attaching postage, C. Elliott..... 517,740 Stapling and cutting machine, Parks & Mollart..... 517,588 Steam and gas generator and engine, combined, N. Eaton..... 517,606 Steam boiler, J. E. Green..... 517,745 Steam trap, G. M. Akeley..... 517,422 Stone, artificial, A. Walshe..... 517,811